Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

VI.

BOTANICAL CONTRIBUTIONS.

By Sereno Watson.

Presented, Oct. 12, 1875.

I. On the Flora of Guadalupe Island, Lower California.

The Island of Guadalupe is in lat. 29° north, about one hundred miles from the coast of Lower California, and two hundred and thirty west of south from the town of San Diego, which is near the southern line of California. It is twenty-six miles in length in a north and south direction, with an average breadth of ten miles, and is traversed by a mountain ridge, the central peak (Mount Augusta) having an elevation of 3900 feet above the level of the sea. From this point the nearest mainland is visible. The sides of the ridge are exceedingly rough and broken, cut up by numerous deep and rocky cañons, and even the more level surfaces are described as usually covered by rocks of every size and form. The rocks are volcanic, and several extinct craters still exist.

The island lies within the great ocean current which flows from the peninsula of Alaska down our western coast, the continuation of what is known as the Japanese Gulf-stream, and in the zone of the north-west trade-winds. Fogs are very prevalent, especially in the winter months (from November to February), when they are driven by the winds over the crest of the island, covering all the northern end and filling the upper portions of the cañons, while the lower cañons and the southern extremity of the island remain clear and warm. These winter winds from the north-west are described as strong and cold, sometimes extremely so, an instance of which occurred during December, 1874, when ice an inch in thickness was formed in the middle of the island, accompanied by two inches of snow, which was followed by hail and five days of cold rain. In summer these winds have less force, though still brisk and chilly for much of the time; and the fogs, instead of being carried over the central ridge, are driven around the northern end, and by eddy-winds are borne into the lower cañons of the eastern side, which are thus made cooler than the region above them. Otherwise the summer months are intensely hot, especially in the southern portion of the island, and the soil becomes soon everywhere so dry that the effect of the temporary summer fogs upon the vegetation is slight. The difference in the seasons, however, at the two extremities of the island is remarkable, as vegetation at the southern end and in the eastern cañons is at least two months earlier than in the northern and western portions, and has for the most part reached its maturity by the close of May, under the then established heats of summer. The annual amount of actual rainfall is very variable, there being an abundance in some years, in others little or none.

Guadalupe was early known to the navigators of these seas, but it was never permanently occupied. There are evidences of its temporary occupation by shipwrecked sailors, and it was also long ago stocked with goats * for the purpose of supplying fresh meat to vessels short of provisions or suffering from scurvy, and though out of the general course of travel it has been occasionally visited on this account. Twelve years ago an expelled governor of Lower California took refuge here with his family, and remained for two years. Soon afterward a party of men from the same State lived for some months upon the island engaged in killing the goats, and during the last ten years it has been occupied by a California company, by whom it was purchased for the purpose of raising the Angora goat, and the island is now overrun by these animals. Several men are kept in continual charge of them, and regular visits are made by the vessels of the company.

With this much of preliminary remark upon those conditions which must affect the vegetation of the island, we may pass to the flora itself. As respects the probable sources from which this flora may have been derived, it is evident that there has been abundant opportunity for the introduction of some species by human agency. These should be especially expected near the usual landing-place upon the eastern side, excepting such as would be probably distributed through the island by means of the goats. Those of most recent introduction in this way would doubtless be Californian; the older might be from the nearer peninsula or from other localities. Of other recognized agencies for the distribution of plants, — the winds, ocean cur-

---

* It is said that this was done by Captain Cook, who, however, was never upon this part of the coast. Vancouver passed near the island in 1793, but without stopping.

rents, and birds, — the prevalent direction of the first from the north-west is adverse to the supposition that any species of phænogamous plants, at least, would be so introduced. The ocean currents might be considered as more favorable, and as likely to bring accessions from the Californian mainland, contributed from the interior by the Sacramento and other smaller streams. But the winds here again would prove an interposing agency, and by creating a surface drift toward the coast would prevent floating seeds from attaining any great distance from it. Such as did succeed in reaching the island, and in obtaining and maintaining a foothold upon it, would probably be wholly Californian. Less certain conclusions might be expected in regard to the agency of birds, but it appears, from the collection of the birds of the island made by Dr. Palmer, that they are all in some measure peculiar to the island itself, "consisting almost entirely of familiar forms of the birds of the Western United States, but showing marked peculiarities, entitling them to recognition as geographical varieties. Nothing Mexican about them in the slightest degree." * So that, though they demonstrate a connection between the island and California, yet they also indicate that that connection has only been at a remote period, and that their participation in the introduction of plants must have been slight.

It might therefore be conjectured, if the island were of comparatively recent formation and always disconnected from the mainland, that its flora would show a meagre list of species almost wholly Californian. Or if, on the other hand, it had at some time been connected with the continent, that then its vegetation would be similar to that of the adjacent peninsula, unless some counteracting influence should have been at work, as would seem to be true of the birds.

To show to what extent the flora of Lower California differs from that of California proper, reference may be made to the list of plants collected by Xantus at the lower extremity of the peninsula, † as given by Dr. Gray in the 6th volume of the Proceedings of this Academy. Of the 118 phanerogamic species there enumerated, only six are probably found even in extreme Southern California, while thirty others range northward only as far as Sonora, or eastward through Mexico to New

---

* Prof. Spencer F. Baird, in letter.

† The Island of Guadalupe is equally distant from San Francisco and Cape San Lucas, but three degrees of latitude nearer to the latter point; and the difference of latitude between the cape and San Diego is little greater than that between Guadalupe and San Francisco.

Mexico or Texas, the remainder being peculiar to the peninsula or exclusively Mexican. The peninsula shares in this difference with Mexico itself, the type of whose whole flora accords rather with that of the eastern portion of the continent northward, except so far as it would necessarily be affected by the more tropical character of the climate. Of this a good and sufficient illustration is seen in the fact that of the *Phaseoleæ*, a tribe which is well represented in all the Atlantic States, Texas, Southern New Mexico, Eastern Arizona, Sonora, Lower California, and all of Mexico southward, not one species is found within the limits of California, nor in the interior basin west of the Rocky Mountains.

The only collection that we have of the plants of Guadalupe is that made by Dr. Edward Palmer during the last season, from February to May, which is probably as complete as was possible, though attended with much labor and difficulty. He visited all parts of the island, often finding it necessary to reach places which the goats had found inaccessible, in order by means of ropes and poles to secure rare specimens of species which appeared to have been elsewhere completely extirpated. The entire number of species is 131, including 102 exogenous and 8 endogenous, the remaining 21 belonging to the higher cryptogamic orders, — ferns, mosses, and liverworts. Omitting a single phænogamous species (a *Heuchera*), of which the material is insufficient for a satisfactory determination, the remaining 109 may be divided into five groups : (1) Introduced species, of which there are twelve; (2) Those that range from the Pacific to the Atlantic States, of which there are nine; (3) Those that are found throughout California, or at least as far north as San Francisco, numbering forty-nine; (4) Those found only in Southern California, below Los Angeles, or in Arizona, numbering eighteen; lastly, those peculiar to the island itself, of which there are twenty-one.

The twelve species * of whose comparatively recent introduction there can be little doubt, are all of European origin, and chiefly from Southern Europe, and are all also found more or less widely naturalized in California. The original introduction of most is probably due to the Spaniards, at least upon the mainland, where the extent to which several have become distributed is something marvellous. The most remarkable is the Alfilaria (*Erodium cicutarium*), which, unlike the wild oat (*Avena fatua*), has not been limited in its range to the western side of the Sierra Nevada, but is found through much of the interior, from New Mexico to Washington Territory. On Guadalupe it is found everywhere, and is more abundant than any other plant. Another species of the same genus (*E. moschatum*), provided with the same contrivances for securing the dissemination and planting of its numerous seeds, occurs less frequently both here and in California; probably because, requiring more moisture, it is unable to maintain itself where the other will flourish. Another instance is the *Oligomeris subulata* of India, Egypt, and the Canary Islands, found also in Southern California, and common eastward through the valleys of the Lower Colorado and of the Gila to the Rio Grande, and in Northern Mexico. It is difficult to account for the wide spread of this plant, if of recent introduction, through a region so desert and sparsely inhabited.

---

* *Brassica nigra; Oligomeris subulata; Silene Gallica; Malva borealis; Erodium cicutarium* and *E. moschatum; Sonchus oleraceus; Anagallis arvensis; Solanum nigrum; Chenopodium album; Avena fatua; Bromus sterilis.*

Besides these twelve species placed in the first group, there are two others, also found in California, which are considered identical with South American forms (*Specularia biflora* and *Amblyopappus pusillus*), possibly introduced from Chili or Peru, perhaps indigenous to both regions. Their presence on Guadalupe would perhaps rather favor the belief that they are native to our western coast, especially as five other South American species, or forms of them, occur in the Guadalupe flora (*Tillæa minima*, *Gilia pusilla*, *Plantago Patagonica*, *Parietaria debilis*, and *Muhlenbergia debilis*), which are more or less frequent in California and eastward in the centre of the continent, and are generally admitted to be native.

There are, therefore, 97 phænogamous plants which may be considered as indigenous. Of these, nine have a very extended range upon the mainland;* one (*Parietaria debilis*) from Southern California across the continent; all the rest common throughout California, and ranging eastward to the Atlantic States. Two of these (*Galium Aparine* and *Juncus bufonius*) are also European, and two (*Plantago Patagonica* and *Parietaria debilis*) are found widely distributed through South America.

Far the largest group, as already stated, includes those species, 49 in number, which are common over a large part of the State of California. Many of these extend northward as far as Oregon or Washington Territory, or eastward through the Great Basin to the Rocky

---

* *Sisymbrium canescens; Silene antirrhina; Daucus pusillus; Galium Aparine; Dodecatheon Meadia; Linaria Canadensis; Plantago Patagonica; Parietaria debilis; Juncus bufonius.*

Mountains. To these are to be added the eighteen species * of more limited range upon the mainland, confined to Southern California or Western Arizona; very few of them, so far as their distribution is known, belonging to Lower California or Mexico, and several of rare occurrence. Among the latter is *Crossosoma Californicum*, known previously only from the Island of Santa Catalina, in the Santa Barbara Archipelago, of which genus the one other species is found in the mountains of Western Arizona. *Leptosyne gigantea* and *Stenochloe Californica* were also known only from the same island, the latter the only species of the genus; the former belonging to a small genus confined to Southern California and the region eastward to New Mexico.

It is evident, therefore, that, as regards the species common to the island and the mainland, the flora may be said to be exclusively Californian in its character. Not a single species is found that is peculiar to Lower California or Mexico. The same alliance is nearly as prominent if we look at the twenty-one new phænogamous species of the island. Fifteen of these (a *Thysanocarpus*, a *Sphæralcea*, a *Lupinus*, a *Trifolium*, an *Œnothera*, a *Megarrhiza*, a *Galium*, a *Hemizonia*, a *Perityle*, a *Bœria*, a *Mimulus*, a *Pogogyne*, a *Calamintha*, a *Phacelia*, and an *Atriplex*) all belong to genera largely or exclusively represented in California and the region east of it, and are mostly closely allied to the species of that region. The remaining six species include a *Lavatera*, a Composite, a Borraginaceous plant, a species allied to the Olive, and finally a palm. The *Lavatera* is interesting as representing a widely scattered genus, not otherwise found in America, except as a second species occurs on the more northern island of Anacapa. The genus belongs chiefly to the region of the Mediterranean, where fourteen species are native; two others are confined to the Canary Islands; another has been discovered in Central Asia, and still another in Australia. The new Composite is referred by Dr. Gray to a South American genus (*Diplostephium*), not otherwise represented in our flora, but of which there are eighteen species in the Andes from the equator southward. Of the Borraginaceous and Oleineous species, Dr. Gray forms new genera; the one (*Harpagonella*) allied to the small genus *Pectocarya*, of which there is one Chilian species, and two Californian, one of these also in the Guadalupe flora; the other (*Hesperelæa*) bearing no close resemblance to any other member of the Olive family. On the other hand, the palm (*Brahea* (?) *edulis*), conspicuous on the island as the only representative of a tropical flora, is probably less nearly related to the Central Mexican genus to which it is provisionally referred than to the genus *Livistona* of Australia. A congener of the Guadalupe species has recently been detected by Dr. Palmer in the cañons of the Tantillas Mountains, near San Diego.

---

* *Crossosoma Californicum; Lepidium Menziesii* and *lasiocarpum; Rhus laurina; Hosackia argophylla; Leptosyne gigantea; Filago Arizonica; Perityle Emoryi; Amblyopappus pusillus; Malacothrix Clevelandii; Antirrhinum Nuttallianum* and *A. speciosum: Lycium Californicum; Eritrichium angustifolium; Pinus insignis; Cupressus macrocarpa; Muhlenbergia debilis; Stenochloe Californica.*

As respects the cryptogamic vegetation, of the half a dozen ferns all are frequent in California, one peculiar to the southern part of the State, another found throughout North America and Europe. Of the eleven mosses, two are strictly Californian species, seven are common everywhere in the United States and Europe, and two are European species which had not previously been detected in America. Of the four *Hepaticæ*, three are Californian, and one is considered new.

Looking now at the relative proportions which the larger orders bear to each other in this limited flora as compared with the flora of the Great Basin (the only at all similar one of which we have the data for comparison), we find that the proportions which the *Compositæ* and *Leguminosæ* bear to the whole (17 and 7 per cent.) are identical in both; while in the next largest orders, the *Cruciferæ*, *Scrophulariaceæ*, and *Gramineæ*, the proportions in the two floras are very nearly the same. The most conspicuous discrepancies are the almost entire absence in Guadalupe of *Cyperaceæ*, *Polygonaceæ*, *Rosaceæ*, and *Liliaceæ*, and a less decided preponderance of *Solanaceæ*, *Borraginaceæ*, and *Hydrophyllaceæ*. These differences are largely due evidently to the character of the surface of the island, though the want of any representatives of the large characteristic western genera, *Eriogonum* and *Astragalus*, is remarkable.

Reference should be made to the plants which by their abundance and prominence give character to the vegetation. Among these the "sage-brush" and "grease-woods" of the valleys of the Basin are duly represented by an *Artemisia* and an *Atriplex*, which share with a *Franseria* in covering large tracts, and in protecting the soil and the smaller annuals from the winds and sun. Trees are numerous over much of the island, chiefly coniferous: a pine, belonging to a Southern Californian species, but peculiar in some of its characters; a juniper, common in California; a cypress, similar to and perhaps identical with a Mexican species which extends into California; and a small oak, which is common throughout the State. To these is to be added the palm, which is frequent in the southern cañons, growing to a height of forty feet, and bearing large clusters of edible fruit.

To conclude, it is apparent, from all that has been said, that this little flora as a whole is to be considered a part of that of California, as distinct from the flora of Mexico. It may be inferred also that it has not been to any great extent derived from California by any existing process of conveyance and selection, but that it is rather indigenous to its present locality. Moreover, while it would indicate a connection at some period between the island and the mainland to the north, yet the number and character of the peculiar species favor the opinion that they are rather a remnant of a flora similar to that of California, which once extended in this direction considerably to the southward of what is now the limit of that flora upon the mainland. And, finally, the presence of so many South American types suggests the conjecture that this, and the similar element which characterizes the flora of California, may be due to some other connection between these distant regions than any which now exists, and even that all the peculiarities of the western floras of both continents had a common origin in an ancient flora which prevailed over a wide, now submerged area, and of whose character they are the partial exponents.

II. *List of a Collection of Plants from Guadalupe Island, made by Dr. Edward Palmer, with his Notes upon them.*[*]

1. RANUNCULUS HEBECARPUS, Hook. & Arn. Abundant on warm slopes in the middle of the island.

2. CROSSOSOMA CALIFORNICUM, Nutt. A shrub two or three feet high, in the crevices of cliffs overhanging the cañons in the middle of the island. Only nine were found, out of reach of the goats, and accessible only by the aid of a rope. In flower, February 10; petals soon falling; seed ripe, April 20.

3. ESCHSCHOLTZIA CALIFORNICA, Cham., var. HYPECOIDES, Gray. Only at the south end in ravines, and in the middle of the island on level ground; apparently not eaten by goats. A form with smaller flowers has been found on rocky heights in the middle of the island.

---

[*] The determinations of the *Gamopetalæ* of the collection were made entirely by Dr. ASA GRAY. The *Musci* were referred to Mr. THOMAS P. JAMES, and the *Hepaticæ* to Mr. AUSTIN. Acknowledgment is made, in connection with a few species, of assistance received from other authorities. The numbers are those under which the collection was distributed.

4. SISYMBRIUM REFLEXUM, Nutt. (*S. deflexum*, Harv.) Abundant in the middle and at the south end, in low grounds; flowers white.

5. BRASSICA NIGRA, Koch. In considerable quantity in the middle of the island, in open spots and on the best soil; eaten by goats.

6. SISYMBRIUM CANESCENS, Nutt. In great abundance in warm sheltered localities.

7. LEPIDIUM MENZIESII, DC. Generally abundant on warm hillsides throughout the island; not much eaten by goats, as also the next.

8. LEPIDIUM LASIOCARPUM, Nutt. In ravines in the middle of the island, rarely at the south end.

9. THYSANOCARPUS ERECTUS, Watson; new species. (See page 124.) Found only between Jack's Bay on the west side and Mount Augusta, in clear level spots; succulent.

10. OLIGOMERIS SUBULATA, Boiss. In deep warm cañons and ravines in the middle of the island, and occasionally at the south end.

11. SILENE GALLICA, Linn. Occurring sparingly in the middle of the island, in level open spots.

12. SILENE ANTIRRHINA, Linn. Only in a cañon on the east side, near the beach.

13. STELLARIA NITENS, Nutt. Among rocks on hillsides, in the middle and at the north end.

14. CALANDRINIA MENZIESII, Hook. In moist spots in the open valleys all over the island, growing in masses; flowers white to rose-color or purple, opening at midday. Goats are very fond of this and the next.

15. CLAYTONIA PERFOLIATA, Donn. All over the island, in masses on the shaded side of rocks or logs, or in deep ravines; flowers pink.

16. MALVA BOREALIS, Wallm. Only on the richer open spots in the middle of the island, in dense masses; goats at first eat only the young leaves, but in summer devour the whole.

17. LAVATERA OCCIDENTALIS, Watson; new species. (See page 125.) A conspicuous plant on the cliffs in the middle of the island, only rarely, and with difficulty, accessible. In flower and immature fruit; April.

18. SPHÆRALCEA SULPHUREA, Watson; new species. (See page 125.) In large bunches, three feet high, very abundant on rocky slopes and in the crevices of the highest rocky ridges, from the middle of the island to the southern end, where it was most frequent; much relished by goats; April to May.

19. ERODIUM CICUTARIUM, L'Her. Abundant all over the island,

and the principal food for the goats, covering the rocks; usually three or four inches high by August, and producing abundance of seed.

20. Erodium moschatum, L'Her. Middle of the island, less common than the last, and starting later in the spring. In low places, the root long, large, and fleshy; leaves light green, fleshy.

21. Rhamnus crocea, Nutt. A scraggy shrub, five feet high, of a dense green hue. Only six were found, growing in the crevices of high cliffs in the middle of the island; in bloom, April 6.

22. Ceanothus crassifolius, Torr. Of rather loose habit, eight feet high; wood very hard. Only three were found alive, at the base of Mount Augusta.

—. Ceanothus cuneatus, Nutt. A small shrub almost exterminated, three nearly dead specimens alone being seen among rocks in the middle of the island; not in bloom.

—. Rhus laurina, Nutt. An irregularly growing shrub, about four feet high, in the crevices of high rocks; only four found; May 20, not in bloom.

—. Vicia exigua, Nutt. Among rocks in the centre of the island, a single specimen seen; very small.

23. Hosackia grandiflora, Benth. Among trees in the middle of the island; flowers yellow, changing the second day to bronze-red.

24. Hosackia argophylla, Gray. In the crevice of a rock; flowers yellow, changing to reddish brown.

25. Lupinus niveus, Watson; new species. (See page 126.) Only in the middle of the island, on high cliffs; one plant in bloom, March 25.

26. Trifolium Palmeri, Watson; new species. (See page 132.) Rather abundant in the middle of the island among rocks and trees on hillsides; flowers whitish with red centre, becoming redder on the edges.

27. Trifolium microcephalum, Pursh. Very abundant at the middle and north end of the island; flowers white or light pink.

28. Trifolium amplectens, Torr. & Gray. Only on the beach on the east side of the island, rare; flowers yellowish white with dark tips.

29. Alchemilla occidentalis, Nutt. Among rocks and sagebrush at the north end, and also around a spring, where it was much larger.

—. Heuchera ——? A single plant in the crevice of a rock, not in bloom.

—. Ribes sanguineum, Pursh. Only two plants in the damp shade of cliffs at the north end; flowers rose-color, becoming white.

30. Tillæa minima, Miers, & var. (*T. leptopetala*, Benth.). In large patches in a few exposed clear spots in the middle and at the north end.

31. Epilobium minutum, Lindl., fide W. Barbey. Only at the north end, among rocks and sage-brush; flowers purplish white.

—. Œnothera Guadalupensis, Watson; new species. (See page 137.) Only two plants were found in a ravine on the east side, near the beach.

32. Mentzelia dispersa, Watson. In ravines in the middle and at the south end; flowers orange, opening after sundown. Goats are not fond of it.

33. Megarrhiza Guadalupensis, Watson; new species. (See page 138.) In crevices of high rocks in the middle of the island; flowers white; fruit green.

—. Sanicula Menziesii, Hook. & Arn.? Two plants only, without flowers or fruit, in crevices of rocks in the middle of the island.

34. Daucus pusillus, Michx. Abundant through the middle of the island, among sage-brush on the sides of cañons and in open level places; not much relished by goats.

35. Galium Aparine, Linn. Common on warm shady hillsides in the middle and more rarely at the south end.

36. Galium angulosum, Gray, Proc. Am. Acad. xi. 74; new species. A single small scrubby plant, in a crevice of a high cliff in the middle of the island; flowers greenish white; May 1.

37. Micropus Californicus, Fisch. & Mey. On dry gravelly slopes in the middle of the island.

38. Filago Arizonica, Gray. On level ground at south end.

39. Diplostephium canum, Gray, Proc. Am. Acad. xi. 75; new species. A large shrub of rather loose habit, some four feet high, in the crevices of high cliffs; flowers yellow; March 28.

40. Franseria bipinnatifida, Nutt.? One of the most conspicuous plants at the south end, especially about Jack's Bay, growing in thick roundish clumps about a foot and a half high, on level spots and among rocks, giving the country a greenish white appearance. Flower-buds red; bloom straw-color, flowering at the end of February. Not relished by goats, but asses are very fond of it.

41. Leptosyne gigantea, Kellogg. Only two plants found, in the crevices of high rocks. Five feet high, branching near the top, and the branches terminated with bright green leaves and masses of showy yellow bloom; May 10.

42. Hemizonia frutescens, Gray, Proc. Am. Acad. xi. 79; new

species. In the middle of the island, only a few small plants among bushes in the crevices of high rocks. It grows in compact bunches with abundant yellow bloom; May 1.

43. PERITYLE INCANA, Gray, l. c. 78; new species. Very common in the middle of the island, in the crevices of high rocks, hanging in massive bunches of yellow bloom; April, and through the summer.

44. PERITYLE EMORYI, Torr. Scattered through some of the cañons on the east side; flowers white, showy, blooming abundantly for three months, commencing in February. Much eaten by goats.

45. BÆRIA PALMERI, Gray, Fl. Calif. ined.; new species. Abundant in warm low spots in the middle and at the south end; flowers showy, gamboge-yellow; February 27.

—. BAHIA LANATA, Nutt., var. A single plant had escaped the goats, on a rocky open spot in the middle of the island; flowers light orange; May 10.

46. AMBLYOPAPPUS PUSILLUS, Hook. & Arn. In low ground at the southern end.

47. MATRICARIA DISCOIDEA, DC. Around springs in the middle of the island.

48. ARTEMISIA CALIFORNICA, Less. In considerable abundance at the south end, in rocky spots, giving character to the vegetation; about a foot and a half high, of rather loose habit. Also in the middle of the island in crevices of the highest cliffs.

49. SENECIO PALMERI, Gray, Proc. Am. Acad. xi. 80; a new species. "White sage;" very abundant on many warm slopes, from the middle to the north end. About three feet high, of diffuse habit, a very free and showy bloomer; beginning to flower early in February and maturing in May, when the air is filled with its downy seeds.

—. GNAPHALIUM SPRENGELII, Hook. & Arn. With the next.

50. MICROSERIS LINEARIFOLIA, Gray. Only in the middle of the island, on stony ridges; eaten close by goats.

51. MALACOTHRIX CLEVELANDII, Gray. Abundant among rocks and trees in the middle of the island; flowers deep yellow.

52. SONCHUS OLERACEUS, Linn. Very rare, on warm slopes in the middle of the island.

—. SPECULARIA BIFLORA, Gray. Rare, in the shade of rocks and sage-brush on hillsides in the middle of the island.

53. GITHOPSIS SPECULARIOIDES, Nutt. Abundant at the middle and north end, under sage-brush and dead branches; flowers white, turning to blue after gathering.

54. PLANTAGO PATAGONICA, Jacq. In level spots at the south end.

—. ANAGALLIS ARVENSIS, Linn. Only three plants found in a gravelly place near the beach on the east side.

55. DODECATHEON MEADIA, Linn. Very abundant on moist rocky slopes at the south end and middle. Goats are very fond of it, and birds eat the buds and flowers.

—. LINARIA CANADENSIS, Spreng. Rare on the sides of cañons in the middle of the island.

56. ANTIRRHINUM NUTTALLIANUM, Benth. Rather rare, in deep warm cañons in the middle of the island; succulent, with small violet flowers, white in the centre and dotted with violet; March 21.

57. ANTIRRHINUM SPECIOSUM, Gray. Frequent in the crevices of high rocks in the middle of the island. Very ornamental, the bright scarlet flowers continuing all summer.

58. MIMULUS LATIFOLIUS, Gray, Proc. Am. Acad. xi. 95; new species. Only in the middle, scattered in warm rather moist spots; flowers velvety red, yellow at base, with a musky odor.

59. CASTILLEIA FOLIOLOSA, Hook. & Arn. Only in the middle of the island, rare, among fallen branches.

60. SOLANUM NIGRUM, Linn., var. Rare in the middle of the island and in a cañon near the beach on the east side, in rich level spots; flowers white or purple; fruit black.

61. SOLANUM NIGRUM, Linn., var. DOUGLASII, Gray. Only two plants in a cañon near the beach on the east side; flowers white, small.

62. SOLANUM XANTI, Gray, l. c. 70. Only in the middle of the island. A very showy shrubby plant, in large bunches, about two feet high, in the crevices of rocks, blooming all the year. Flowers numerous, lilac or purple; fruit small, changing from green to yellow, mottled, and at length very dark plum-color, maturing very slowly.

63. LYCIUM CALIFORNICUM, Nutt.; Gray in Fl. Calif. ined. At the extreme south end, on rocky bluffs, not abundant. A loose shrub, about two feet high; flowers creamy white, tinged with lilac.

64. NICOTIANA BIGELOVII, Watson. Only in a few places in the centre of the island, in open spots and good soil; flowers greenish yellow, bronzy below. The leaves stick to the goats' hair and do much damage.

65. POGOGYNE TENUIFLORA, Gray, Proc. Am. Acad. xi. 100; new species. Very rare, among sage-brush, on the eastern side.

66. CALAMINTHA PALMERI, Gray, l. c.; new species. Abundant among trees and sage-brush in the middle of the island; strong-scented and not eaten by goats.

67. ERITRICHIUM ANGUSTIFOLIUM, Torr. On level spots at the south end, and also near the beach on the eastern side.

68. ERITRICHIUM MURICULATUM, Torr. In warm clear places in the cañons of the middle of the island.

69. AMSINCKIA VERNICOSA, Hook. & Arn. Very abundant on level ground at the south end; flowers orange.

69 *a*. PECTOCARYA PENICILLATA, DC. With the next.

70. HARPAGONELLA PALMERI, Gray, Proc. Am. Acad. xi. 88; new genus. Only at the south end, in low valleys; often prostrate.

71. PHACELIA PHYLLOMANICA, Gray, l. c. 87; new species. In large compact masses in the crevices of high rocks in the middle of the island; rare.

72. Same, var. INTERRUPTA, Gray, l. c. Frequent in warm nooks in rocky ravines in the middle and at south end; February to May.

73. EMMENANTHE PENDULIFLORA, Benth. Rocky ravines in the middle of the island; refused by goats, but asses are fond of it.

74. ELLISIA CHRYSANTHEMIFOLIA, Benth. Abundant under sagebrush on warm hillsides from the middle to the north end, and also rarely at the south end; flowers lilac.

75. Same, with narrower calyx-lobes and larger corolla.

76. NEMOPHILA AURITA, Lindl. On warm slopes in the middle of the island, rarely at the south end; much relished by goats, like the last.

77. COLLOMIA GILIOIDES, Benth., var. GLUTINOSA, Gray. Abundant under brush and in protected places in the middle of the island.

78. GILIA MULTICAULIS, Benth., var. MILLEFOLIA, Gray. Very abundant in similar localities; flowers blue and showy, or cream-colored with a violet base.

79. GILIA PUSILLA, Benth., var. CALIFORNICA, Gray. Abundant in similar localities.

80. CONVOLVULUS OCCIDENTALIS, Gray, Proc. Am. Acad. xi. 89. In the crevices of high rocks, hanging down six feet or more; continuing in bloom from March through the summer. A thousand flowers were seen on a single plant.

81. HESPERELÆA PALMERI, Gray, Proc. Am. Acad. xi. 83; new genus. A rather compact tree, twenty to twenty-five feet high; flowers lemon-color. Only three live trees were found, in a cañon on the east side; no young trees seen, but many dead ones.

82. MIRABILIS CALIFORNICA, Gray. Of compact branching habit, growing in crevices in the walls of cañons on the east side; color lilac-purple.

—. CHENOPODIUM ALBUM, Linn. Only one plant near the sea on the east side.

83. ATRIPLEX PALMERI, Watson; new species. (See page 146.) Only at the south end, in roundish bunches, about a foot and a half high. One of the three characteristic perennials of the island, much more frequent than *Artemisia Californica*, but scarcely half so abundant as *Franseria bipinnatifida*. In flower at the end of February.

84. PTEROSTEGIA DRYMARIOIDES, Fisch. & Mey. In the shade of rocks in the middle and more rarely at the south end.

85. PHORADENDRON BOLLEANUM, Seem. Near the south end, on *Juniperus* and *Cupressus*, more frequently the former.

86. HESPEROCNIDE TENELLA, Torr. In damp shady places, among high rocks, in the middle of the island.

87. PARIETARIA DEBILIS, Forst. Abundant in similar localities.

88 and 89. QUERCUS CHRYSOLEPIS, Liebm.; fide Dr. Engelmann. Frequent at the north end, and occasionally found in the cañons on both sides of the island. Often large, sometimes forty feet high, and wide-spreading; timber good and durable, though knotty.

90. PINUS INSIGNIS, Dougl., var.; fide Dr. Engelmann; with leaves in twos. At the north end, at high elevations. Very vigorous and handsome trees, usually spreading widely, the largest seven and a half feet in circumference and averaging seventy feet high. The wood is very knotty and soon decays. At the extreme northern end, facing Espaza Bay, the trees assume a hedge-like form, owing to the force of the winds.

91. JUNIPERUS CALIFORNICA, Carr., fide Dr. Engelmann. All over the middle of the island and occasionally at the south end, in the ravines and low valleys, forming groves about fifteen feet high. It is exceedingly crooked, the timber small but very durable. As soon as dead the ants take possession of it.

92. CUPRESSUS MACROCARPA, Hartw.? A fine widely spreading tree, though varying much in habit, growing in irregular clusters in the middle of the island. It averages about forty feet in height. A tree thirty-eight feet high and seven in circumference numbered 236 annual rings. The largest is at the head of Landrum's Cañon, twenty-five feet in circumference, dividing into seven branches at the height of two or three feet, the main limb at ten feet above the forks being thirteen feet around. The bark is claret-brown, shining when wet, at length cracking irregularly and curling up in thin plates. An abundance of resin is exuded, especially as the bark is eaten off by the goats. The wood

is white, very knotty and liable to crack, when dry impervious to nails, and decaying rapidly if exposed to wet. Fruit is abundant.

—. BRAHEA EDULIS, Wendland; new species. (See page 146.) Frequent in deep warm ravines, from the northern end to Jack's Bay; the only thing on the island having a tropical look. It attains a height of about forty feet, averaging fifteen inches in diameter. Each tree bears one to four clusters of fruit, four feet in length, and each weighing forty or fifty pounds. The fruit is eaten by man, goats, birds, and mice. In flower near the end of March.

93. JUNCUS BUFONIUS, Linn. From the middle to the north end of the island, growing abundantly in very springy places and a sure indication of water; not much eaten by goats.

94 and 94*a*. AVENA FATUA, Linn., and var. Several small patches were found in open places and on the best soil.

95. MUHLENBERGIA DEBILIS, Trin. Identical with Arizona specimens so referred. Growing in abundance on warm slopes in the middle of the island, more rare at the south end; not much eaten by goats till dried in summer.

96. STENOCHLOE CALIFORNICA, Nutt. in Pl. Gambel. 189, fide Professor Thurber. On warm rocky slopes in the middle of the island; not very abundant; very succulent, and the goats are very fond of it. Known previously only from Nuttall's specimens.

97. FESTUCA MICROSTACHYS, Nutt. In bunches on warm slopes and in open places in the middle of the island.

98. MELICA IMPERFECTA, Trin. In tufts in the crevices of high rocks in the middle of the island.

99. BROMUS STERILIS, Linn. On warm hillsides, sometimes in large patches as if sown, at the south end and middle.

100. PELLÆA ORNITHOPUS, Hook., fide Professor Eaton. Rare, in the crevices of the highest cliffs.

101. GYMNOGRAMME TRIANGULARIS, Kaulf. In similar places in the middle and at the south end of the island.

102. ASPIDIUM MUNITUM, Kaulf. In large bunches; only two seen at the northern end in a rocky place inaccessible to goats, and constantly damp from the prevalent fogs.

103. POLYPODIUM CALIFORNICUM, Kaulf., fide Professor Eaton. Abundant at the north end in the cracks of rocks, in damp localities, sometimes covering large surfaces.

104. POLYPODIUM SCOULERI, Hook. Encircling the trunk of a single oak, in a thick mat of moss and constantly wet by the fogs,

covering the tree with a network of its strong tough roots to the height of ten feet.

105. NOTHOLÆNA NEWBERRYI, Eaton. Throughout the island on rocks in dry exposed places.

106. WEISSIA VIRIDULA, Brid.

107. CERATODON PURPUREUS, Brid.

108. BARBULA RIGIDA, Schultz, var. PILIFERA. Not before collected in America.

109. BARBULA ATROVIRENS, Smith. Also new to America.

110. BARBULA VINEALIS, Brid.

111. BARBULA RURALIS, Hedw.

112. ORTHOTRICHUM LYELLII, Hook.

113. GRIMMIA PULVINATA, Hook. & Tayl.

114. GRIMMIA TRICHOPHYLLA, Grev.

115. HYPNUM MYOSUROIDES, Linn.

——. ALSIA CALIFORNICA, Sulliv.

116. MADOTHECA NAVICULARIS, Nees.

117. FOSSOMBRONIA LONGISETA, Austin.

118. FIMBRIARIA CALIFORNICA, Austin.

119. FIMBRIARIA PALMERI, Austin, Bulletin Torrey Botanical Club, 6. 47; new species.

III. *Descriptions of New Species of Plants, chiefly Californian, with Revisions of certain Genera.*

ANEMONE (PULSATILLA) OCCIDENTALIS. Alpine, more or less villous, stout and often tall: leaves large, long-petioled, biternate and pinnate; lateral primary divisions nearly sessile; segments pinnatifid with narrow laciniately toothed lobes; involucral leaves similar, nearly sessile upon the middle of the stem: flower solitary, white or purplish, an inch broad or more: sepals six or seven: receptacle conical, becoming much elongated: tails of the linear-oblong akenes at length an inch and a half long, reflexed. — *A. alpina*, Hook. Fl. Bor.-Am.; Torr. & Gray, Flora; &c., not Linn. In the mountains, from British Columbia southward to Mt. Shasta and Lassen's Peak; perhaps also the *A. alpina* of arctic collectors from Kotzebue Sound, &c., of which specimens are not at hand. It differs from *A. alpina* of Europe and the Caucasus in its more finely and narrowly dissected leaves, which have also the primary divisions much more shortly petiolulate, and in the lengthened receptacle (sometimes an inch and a half long), which in the other is small and hemispherical.

Crossosoma Bigelovii. A low shrub, more slender than *C. Californicum*, and all the parts much smaller: leaves glaucous, three to six lines long, oblong, somewhat fascicled: pedicels slender, terminating very short branchlets: petals oblong, three lines long: stamens about fifteen: carpels 10–12-ovuled. — *C. Californicum*, Torrey in Pacif. R. Rep. iv. 63, t. 1, excl. fig. 1, 2. Collected by Dr. Bigelow, on Lieut. Whipple's Expedition, in cañons near the mouth of Bill Williams River, W. Arizona; in flower only. The petals are narrower and the stamens and ovules much less numerous than in the island species. Of the latter, fine fruiting specimens were for the first time obtained by Dr. Palmer on Guadalupe Island; but the characters of the embryo, which is found to be nearly as long as the thick fleshy albumen and strongly curved, with narrowly oblong cotyledons longer than the radicle, do not confirm the reference of the genus either to the *Pæonieæ* or to the *Dilleniaceæ*.

Eschscholtzia minutiflora. Slender, and about a foot high: flowers very small (three lines or less in diameter), orange; torus cylindrical, without border: capsule very narrow, an inch and a half long: seeds nearly smooth, scarcely half a line broad. — *E. Californica*, var. *tenuifolia*, Gray in Bot. Ives's Rep. 5, in part. *E. Californica*, var. *hypecoides*, Watson, Bot. King's Rep. 14. From Northwestern Nevada to Arizona and Southern Utah (Parry), apparently confined to the inner basin. It has smaller and smoother seeds, smaller flowers, and narrower capsules than any other form.

Arabis Lyallii. Perennial and alpine or subalpine, glabrous and bright green or glaucous, or somewhat villous below with spreading hairs, especially on the margins of the petioles; rarely more or less canescent with stellate hairs: stems slender, from a branching base, two to fifteen inches high, often dwarf: radical leaves oblanceolate, on slender petioles, acute, entire; the cauline oblong-lanceolate, clasping and sagittate at base: petals light pink, about three lines long, twice longer than the sepals: style none: pods straight, narrow, erect or ascending, one to three inches long: seeds in two rows, narrowly winged. — *A. Drummondii*, var. *alpina*, Watson, Bot. King's Rep. 18. In the mountains from Washington Territory to Mono Pass in the Sierra Nevada, and eastward to W. Wyoming and Utah. Resembling some forms of *A. Drummondii*, but distinguished by its perennial root.

Arabis repanda. Biennial, pubescent with loose branched hairs, especially below: stem rather stout and coarse, two feet high, the spreading branches somewhat flexuous: leaves oblanceolate, three or four inches long, obtuse, coarsely sinuate-toothed, attenuate to a broad petiole; those on the branches narrower and acutish: calyx pubescent, a line and a half long or less, a little shorter than the pinkish petals: pods somewhat pubescent, ascending, falcate, three inches long and a line wide: style very short: seeds in one row, broadly winged. — Yosemite Valley, n. 4881 Bolander. A strongly marked species.

ARABIS BREWERI. Perennial, cespitose, canescent with a dense stellate pubescence and villous above with spreading nearly simple hairs: stems simple from a branching base, two to ten inches high: radical leaves spatulate, an inch long or less, shortly petioled, entire; the cauline ovate-oblong, sessile but not sagittate, acute: petals deep rose-color, from one to four lines long, twice longer than the purplish sepals: pods spreading or recurved, about two inches long, a line wide: style none: seeds in one or two rows, narrowly winged. — In the Coast Ranges from Mt. Diablo (Brewer, Bolander) to Lake County (Greene) and Mendocino County (Bolander). Most like *A. arcuata*, Gray, of the Sierra Nevada and mountains of S. California, which is a taller species, with larger flowers, longer pods, and different pubescence, the leaves mostly toothed and the cauline ones sagittate.

SMELOWSKIA (?) FREMONTII. A dwarf alpine perennial, pubescent with scattered short spreading hairs, the branching somewhat woody base covered with a few remnants of old leaves: stems two to four inches high: leaves less than half an inch long, pinnate with one to three pairs of linear leaflets, which are strongly nerved and slightly revolute: sepals glabrous, broad, less than a line long; petals white, twice longer: immature pods two to three lines long, somewhat obcompressed, obtuse at base and scarcely attenuate above, beaked with a short thick style; valves faintly nerved: seeds small, ten or more in each cell; cotyledons obliquely incumbent. — Collected by Fremont on hills near Klamath Lake, and by Lemmon in the northern Sierra Nevada. It much resembles *S. calycina* in habit, but the characters of the fruit do not fully accord with those of the genus.

LYROCARPA PALMERI. Pod reniform-obcordate, rounded at the base, four or five lines wide, broader than high: cells 2-seeded, the upper seed horizontal, the lower pendulous: petals linear, purplish, six lines long, twice longer than the calyx. — It otherwise resembles the original *L. Coulteri*, Hook. & Harv. The peculiarities of the fruit require a modification of the received generic character. From the Big Cañon of the Tantillas Mountains, below San Diego; collected by Dr. Edward Palmer.

THYSANOCARPUS ERECTUS. Smooth and leafy: leaves oblong to oblanceolate, an inch or two long, auricled at base, somewhat sinuate-dentate: flowers purple or rose-colored: fruiting pedicels erect: pod minutely pubescent, the wing of the fruit (still immature) without indication of nervation or perforation: style very short — Collected by Dr. E. Palmer on the western side of Guadalupe Island. Distinguished especially by its erect pedicels.

FRANKENIA PALMERI. A rather slender diffuse shrub, a foot high, with short straight divaricate branchlets: leaves numerous, fascicled, a line or two long, thick and strongly revolute so as to be nearly terete, canescent with a white papillose and furfuraceous encrustation: calyx a line and a half long: petals linear, a little exserted: stamens four: style bifid: capsule 2-seeded. — Lower California, upon the gulf side, Dr. E. Palmer.

SILENE PALMERI. Puberulent with short spreading hairs, glandular above: stems a foot high, slender, from a branching base: leaves oblanceolate, an inch long: flowers purplish, on slender pedicels, in an open panicle: calyx four lines long; teeth short: petals very narrow, half an inch long; blade 4-parted with linear entire or bifid lobes; appendages linear; claw not auricled, and with the filaments very villous: styles and stamens much exserted: capsule oblong, exceeding the calyx; stipe scarcely a line long: seeds tubercular, not crested. — In the Cuyamaca Mountains, San Diego County; Dr. Edward Palmer, August, 1875.

CALANDRINIA BREWERI. Much resembling *C. Menziesii*, from which it is distinguished by its divaricately spreading or deflexed pedicels; by a longer conical blunt capsule, 4 to 5 lines long, and exceeding the triangular-ovate sepals; and by the rather smaller (half a line broad) seeds, which are more strongly tuberculate, and not shining. — *C. Menziesii*, var. *macrocarpa*, Gray in Proc. Am. Acad. 3. 102. Collected by Professor W. H. Brewer, in the Santa Inez Mountains, near Santa Barbara; the only specimens are a foot tall or more, with elongated racemes.

LAVATERA OCCIDENTALIS. A close shrub, three or four feet high, leafy at the ends of the short branches: leaves stellate-puberulent, round-cordate, 7-lobed to the middle, three to five inches broad, on long petioles; lobes acutish, coarsely toothed: flowers axillary, solitary, on short deflexed pedicels: calyx over an inch long, twice longer than the involucre, cleft to the middle into broad foliaceous lobes: petals narrowly spatulate with a broad naked claw, emarginate, two inches long, straw-colored with violet stripes: fruit half an inch broad, finely pubescent; carpels six to ten, about equalling the short conical summit of the axis. — Collected by Dr. E. Palmer on the cliffs of Guadalupe Island. An interesting discovery as confirming the American habitat of the genus.

MALVASTRUM COULTERI. Perennial, somewhat pubescent, with slender branches: leaves small, ovate or somewhat cordate, 3–5-lobed, acutely toothed, equalling or exceeding the slender petioles; flowers small, in a rather loose raceme: calyx-lobes acuminate: petals rose-colored, 4 or 5 lines long: carpels rounded, less than a line in diameter, with a thin horizontal oblong projection inward at base, very strongly reticulated, pubescent below. — Collected probably in South-eastern California by Coulter (n. 96), and in the valley of the Gila by Schott, on the Mexican Boundary survey. Very peculiar in the character of its carpels.

SPHÆRALCEA SULPHUREA. Perennial, resembling *S. Emoryi* in habit, but more tomentose, and the inflorescence usually much more paniculate and diffuse: leaves ovate, two to four inches long, exceeding the petioles, more or less distinctly 3–5-lobed, acutish, crenately toothed, cordate to abruptly cuneate at base: flowers sulphur-yellow or whitish, usually tinged with pink: calyx two or three lines long, with broad acute lobes: petals twice longer, villous at the base of the claw: fruit globose; carpels semicircular, a line and a half long, reticulate on the sides. — On Guadalupe Island, Dr. E. Palmer; growing abundantly among rocks, in large bunches three feet high.

ABUTILON NEWBERRYI. Woody at base, often four to five feet high, densely tomentose; branches short and stout: leaves thick, oblong-lanceolate, acutish, cordate at base, one or two inches long, on short petioles: pedicels fascicled in the axils, much shorter than the leaves: flowers deep yellow, three lines long: carpels about eight, somewhat membranaceous, three lines long, narrower but rounded above, 2-valved to the base, 3-seeded. — *Sphæralcea incana*, Gray, Bot. Ives's Exp. 8. At Canebrake Cañon on the Lower Colorado by Newberry, on the Lower Gila by Emory, and in the Big Cañon of the Tantillas Mountains, below San Diego, by Palmer.

TRIBULUS CALIFORNICUS. Small, hoary-pubescent and hairy: leaflets about six pairs, oblong-elliptical, two or three lines long: flowers yellow, very small, the petals little longer than the narrow sepals: fruit deeply 5-lobed, two lines or less in diameter, short-beaked; the carpels with four or five stout obtuse tubercles upon the back; pedicels shorter than the leaves. — Collected by Dr. E. Palmer, in Lower California (1870), on the eastern side of the peninsula.

ADOLPHIA CALIFORNICA. A shrub of rigid and compact habit, about two feet high; the branches terete, with spreading spiny branchlets, puberulent: leaves orbicular to oblong-ovate, one or two lines long, mucronate or often retuse, abruptly attenuate to a slender petiole: flowers greenish, on pedicels about equalling the leaves; petals rather deeply hooded: fruit two lines in diameter; the short style deciduous from the very base. — *A. infesta*, Torrey, Bot. Mex. Bound. 45, in part. At Solidad and Chollas Valley, near San Diego, and near Monterey; collected by Parry, Cleveland, and Palmer. The more eastern *A. infesta*, Meisner, is distinguished by its larger linear or oblong-lanceolate leaves, attenuate to a short petiole; petals less deeply hooded; and longer style, jointed above the base, and leaving the capsule apiculate.

THERMOPSIS CALIFORNICA. Woolly-tomentose throughout: stipules lanceolate; leaflets obovate to oblanceolate, 1 or 2 inches long, acute or obtuse, equally tomentose on both sides: bracts mostly ovate, broad and clasping at base: pod on a short glabrous stipe, very pubescent, linear, 6–8-ovuled; mature fruit not known. — *T. macrophylla*, Torrey, Pacif. R. Rep. 4. 81; &c. *T. fabacea*, Torrey, Bot. Mex. Bound. 58. Marin and Napa counties, California, and probably southward. *T. macrophylla*, H. & A., is distinguished by its villous spreading pubescence, its large leaves glabrous above, and broad 4–5-seeded pod. The more northern and eastern species, *T. montana*, Nutt. (usually referred to *T. fabacea*, DC.), is much more glabrous, the linear pods 10–12-seeded.

LUPINUS NIVEUS. White throughout with a short dense tomentum, without villousness: stems a foot high, branching, leafy: leaflets nine, broadly oblanceolate, acutish, an inch long or more, shorter than the petioles: flowers subverticillate, in a shortly peduncled loose raceme; pedicels two or three lines long; bracts short, deciduous: calyx-lips equal; the lower narrow, nearly entire; the upper bifid: petals equal, broad, all naked, four or five lines long, deep blue, the banner greenish yellow in the centre: pod 5-ovuled. — Collected by Dr. E. Palmer, on Guadalupe Island, on rocks. Allied to *L. leucophyllus.*

LUPINUS GRAYI. A span high, densely hoary-tomentose throughout, usually with some silky hairs: leaflets five to nine, cuneate-oblong or oblanceolate, obtuse or acutish, shorter than the petioles: racemes peduncled, short and loosely flowered, with rather slender pedicels a line or two long; bracts subulate, equalling the calyx, deciduous: flowers subverticillate, light blue, rather large (six to seven lines long), with broad wings and broad naked banner; keel ciliate: pod 5–6-seeded, an inch long or more. — In the Sierra Nevada; near Clark's Ranch, Mariposa Co., Dr. Asa Gray; Indian Valley, Plumas Co., Mrs. M. E. Pulsifer Ames. With the large flowers and loose raceme of *L. ornatus*, but otherwise more nearly allied to the *L. leucophyllus* group.

LUPINUS ONUSTUS. A span high or less, with a decumbent and somewhat woody base, rather sparingly silky-villous: leaflets five to eight, oblanceolate, acute or acutish, glabrous above, about an inch long, the petioles two or three times longer: flowers deep blue, small (four lines long), scattered in a loose short and shortly peduncled raceme; bracts short, deciduous; pedicels slender: calyx slightly gibbous: banner naked; keel strongly ciliate: pod half an inch broad, an inch and a half long, 6-ovuled: seeds brown, over three lines broad. — Indian Valley, Plumas Co., by Mrs. M. E. Pulsifer Ames; Sierra County, Lemmon. Most nearly resembling *L. parviflorus* on a reduced scale, but very distinct in its fruit.

TRIFOLIUM (LUPINASTER) LEMMONI.* Dwarf and cespitose, alpine, sparingly appressed-pubescent, the short rather slender stems from a stout thick perennial root: stipules ovate, acuminate, toothed;

---

* We give the following revision of the North American species of this genus: —

§ 1. Leaflets 5 to 7: heads not involucrate, terminal and axillary: flowers sessile: calyx-teeth filiform, plumose: low or dwarf perennials. — Western species.

1. T. MEGACEPHALUM, Nutt. Stout, somewhat villous: stipules ovate-oblong; leaflets obtuse, nearly an inch long: flowers in very large spicate heads: pod smooth, 6-ovuled. — North-eastern California and Northern Nevada to Washington Territory.

2. T. ANDERSONII, Gray. Cespitose, densely villous: stipules lanceolate; leaflets smaller, acute, nearly entire: flowers smaller, umbellate: pod tomentose, about 5-ovuled. — Proc. Am. Acad. 6. 522. North-eastern California and Northern Nevada.

3. T. LEMMONI, Watson. See above.

§ 2. Leaflets 3: heads not involucrate, terminal: perennial or biennial.

* Flowers on slender pedicels, large. — Eastern species.

4. T. REFLEXUM, L. Not stoloniferous: leaflets obovate to cuneate-oblong: flowers numerous, umbellate on the summit of the peduncle: pod stipitate, 4-ovuled. — *T. platycephalum*, Bisch. in Linnæa, 14. 132 (Litt.-Bericht.). From Canada West to Florida and Texas.

5. T. STOLONIFERUM, Muhl. Stoloniferous: leaflets broadly obovate, retuse: flowers fewer, on an evident rhachis: pod nearly sessile, 2-ovuled. — Ohio and Kentucky to Missouri.

leaflets three to five, thick, obovate, obtuse, coarsely toothed, half an inch long or less: peduncles mostly terminal, equalling the leaves: flowers numerous, spicate upon a short rhachis (only two lines long),

---

* * Flowers sessile or nearly so. — Western species.

+– Caulescent, often tall.

++ More or less pubescent: calyx-teeth very narrow, much longer than the tube, plumose or hairy: stipules lanceolate, acuminate.

6. T. ERIOCEPHALUM, Nutt. Usually spreading-villous: leaflets oblong: flowers in dense ovate heads, at length reflexed: teeth filiform, lax, very plumose: ovary hairy. — N. California to Oregon and Idaho.

7. T. PLUMOSUM, Dougl. Somewhat appressed-villous: leaflets elongated, narrowly oblong to linear: heads oblong or ovate; flowers not reflexed: teeth straight, plumose: ovary smooth. — Oregon, Idaho.

8. T. LONGIPES, Nutt. Stem usually glabrous: leaflets shorter, narrowly oblong, mostly very acute: heads ovate, smaller and looser: teeth straight, more or less hairy. — Var. LATIFOLIUM, Hook. Often low: leaflets broader: flowers pedicellate in loose heads. — From the Rocky Mountains to the Pacific.

++ ++ Glabrous throughout: calyx-teeth subulate, rigid, contorted, twice longer than the tube: flowers sessile: stipules lanceolate, acuminate.

9. T. ALTISSIMUM, Dougl. Stout: leaflets narrowly oblanceolate, acute. — Oregon, Idaho.

++ ++ ++ Glabrous throughout: calyx-teeth straight, scarcely longer than the tube: stipules mostly ovate, acute, entire: flowers on very short pedicels, at length reflexed.

10. T. BECKWITHII, Brewer, ined. Stout: leaflets oblong to oblanceolate, obtuse or acute, 1 or 2 inches long, coarsely veined and toothed: flowers 7 to 9 lines long, in dense globose heads: teeth linear-subulate: ovary 2–6-ovuled. — *T. altissimum,* Torr. & Gray, Pacif. R. Rep. 2. 120. N. E. California to S. Idaho.

11. T. KINGII, Watson. Smaller and more slender: leaflets usually narrow and acuminate: flowers 4 to 7 lines long, in looser heads. — Bot. King's Rep. 59. *T. Haydeni,* Porter, Hayden's Rep. 1871, 480. N. E. California to Montana and Utah.

12. T. BOLANDERI, Gray. Cespitose, decumbent: leaflets small, broad and obtuse, very finely reticulated, slightly serrulate: flowers few, 3 or 4 lines long: teeth lanceolate, scarcely as long as the tube: ovules 2. — Proc. Am. Acad. 7. 335. Yosemite Valley.

+– +– Dwarf, cespitose, acaulescent or nearly so. — Rocky Mountains to Utah.

++ Glabrous: flowers large: ovary smooth, linear, 8-ovuled.

13. T. NANUM, Torr. Leaflets small, oblanceolate, serrulate: flowers 1 to 3, 6 to 9 lines long: calyx-teeth broad, acute.

14. T. BRANDEGEI, Watson. See p. 132.

very small (so far as known): calyx villous, two lines long, the filiform plumose teeth exceeding the purplish petals: banner deeply hooded: ovary smooth, 2-ovuled. — From Lassen's Peak, by J. G. Lemmon,

---

++ ++ Pubescent: flowers small: ovary obovate, densely villous, 2-ovuled, at length exserted from the calyx.

15. T. GYMNOCARPON, Nutt. Leaflets ovate-oblong to oblanceolate: flowers 3 to 5 lines long, in rather close heads. — *T. subcaulescens*, Gray, Bot. Ives's Rep. 10.

§ 3. Leaflets 3: heads not involucrate, axillary or rarely terminal: annuals.

* Pubescent: heads mostly terminal: flowers sessile, not reflexed: calyx-teeth long-filiform, very plumose: ovules 2. — Western.

16. T. MACRÆI, H. & A. Flowers dark-purple, 3 lines long, in dense ovate long-peduncled heads. — Var. DICHOTOMUM, Brewer. Taller and stouter, with larger flowers: corolla more conspicuous, tipped with white. *T. dichotomum*, H. & A. — From the Columbia River to S. California. The typical Chilian form appears to have nearly sessile heads and stouter calyx-teeth.

* * Mostly glabrous: heads axillary, small: flowers shortly pedicellate, at length reflexed: calyx-teeth subulate or short.

+ Calyx-teeth subulate: ovules 2. — Western species. (*T. depauperatum* might be looked for here.)

17. T. CILIATUM, Nutt. Glabrous: leaflets obtuse or retuse: calyx campanulate; teeth lanceolate, rigid, the scarious margin rough-ciliate. — Pl. Gambel. 152. *T. ciliolatum*, Benth. Pl. Hartw. 304. From the Columbia to S. California.

18. T. GRACILENTUM, Torr. & Gray. Slender: peduncles rarely villous with spreading hairs: leaflets retuse: heads rather dense: calyx campanulate; teeth subulate, equalling the corolla. — *T. denudatum*, Nutt. Pl. Gambel. 152, t. 24. From the Columbia to S. California.

19. T. BIFIDUM, Gray. Leaflets narrow, deeply notched or cleft, the sides sparingly toothed or entire: otherwise as the last. — Proc. Am. Acad. 6. 522.

20. T. AMABILE, HBK. Similar to *T. gracilentum*, but more decumbent, pubescent: calyx-teeth linear-setaceous, somewhat villous. — Mexico and Western South America.

21. T. BREWERI, Watson. See p. 132.

22. T. PALMERI, Watson. See p. 132.

+ + Ovules 4 or more: low, decumbent: leaflets obcordate or obovate. — Eastern species.

23. T. CAROLINIANUM, Michx. More or less pubescent: corolla 2 lines long, scarcely exceeding the green subulate calyx-teeth. — Pennsylvania to Florida and Texas.

24. T. AMPHIANTHUM, Torr. & Gray. Stoloniferous, very slender, nearly glabrous: flowers few, 4 lines long: calyx-teeth slender, much shorter, equalling

1875. The few specimens are imperfect, only a few perhaps undeveloped flowers remaining on the receptacles.

Trifolium Brandegei. Dwarf, perennial, cespitose and acau-

---

the tube: small solitary fertile flowers often borne under ground. — Louisiana to Texas.

25. T. Bejariense, Moricand. Slightly hairy: calyx herbaceous, unequally lobed, nearly equalling the corolla; upper tooth nearly distinct, narrow; the rest broad, acute, reticulated: standard and wings broad, toothed, 3 lines long. — Pl. Nouv. 2, t. 2. *T. macrocalyx*, Hook. Ic. Pl. t. 275. Texas.

§ 4. Leaflets 3: heads subtended by a mostly monophyllous usually many-cleft involucre, axillary: flowers in whorls, sessile or nearly so, not reflexed.

* Low or dwarf perennials, acaulescent or nearly so: flowers rather large: involucre parted, somewhat scarious. — Rocky Mountains.

26. T. Parryi, Gray. Glabrous, often stout: leaflets oblong to oblanceolate: flowers large, in close heads: bracts 5 to 7, oblong, obtuse: calyx-teeth broadly subulate, equalling the tube. — Am. Jour. Sci. 2. 33. 409.

27. T. dasyphyllum, Torr. & Gray. Cespitose, silky: leaflets linear-lanceolate, entire: bracts very small, unequal, lanceolate: teeth linear, much longer than the tube.

28. T. Andinum, Nutt. Cespitose, silky: leaflets cuneate-oblong, entire: involucre of 2 broadly stipuled 3-foliolate leaves: teeth subulate, nearly equalling the smaller flowers. — Watson, Bot. King's Rep. 60, t. 8.

* * Slender annuals: corolla not becoming inflated. — Western.

+– Involucre not membranaceous, deeply lobed: lobes laciniately and sharply toothed.

29. T. involucratum, Willd. Glabrous: leaflets mostly oblanceolate, acute at each end: flowers ½ inch long, in close heads: teeth thin, long and narrow, entire: ovules several. — *T. Wormskioldii*, Lehm. *T. fimbriatum*, Lindl. *T. spinulosum*, Dougl. From British America to Mexico.

Var. heterodon. Heads mostly larger and leaflets broader: some of the teeth setaceously cleft. — *T. heterodon*, Torr. & Gray. Washington Territory to New Mexico.

30. T. tridentatum, Lindl. Smooth or glandular-puberulent: leaflets linear to narrowly lanceolate: flowers 6 to 8 lines long in close heads: teeth rigid, rather abruptly narrowed from a broad base into the spinulose apex, entire or shortly toothed: ovules 2. — *T. involucratum*, Torr. & Gray. *T. aciculare* & *polyphyllum*, Nutt. From Washington Territory to S. California.

Var. obtusiflorum. Stouter, often glandular: leaflets usually broader and heads large: teeth entire. — *T. obtusiflorum*, Hook. Central California.

Var. melananthum. Smooth, often low: flowers smaller, dark-purple: teeth entire or toothed. — *T. melananthum*, Hook. & Arn. *T. variegatum, β.*, Torr. & Gray. S. California to Arizona.

31. T. pauciflorum, Nutt. Smooth, very slender: involucre small: flowers little exceeding the calyx, rather few: teeth rigid, setosely acuminate, entire. —

lescent, glabrous, the inflorescence slightly villous: stipules scarious; leaflets elliptic-oblong, thin, acutish, entire, a half to an inch long: peduncles about equalling the leaves: flowers spicate in a loose naked head, purplish, seven lines long: calyx-teeth lanceolate, acuminate, a little longer than the campanulate tube: ovary stipitate, 7-ovuled. — On the north-western border of New Mexico; collected by T. S. Brandegee, on Hayden's Survey. A strongly marked and peculiar species.

TRIFOLIUM BREWERI. Annual, very slender and diffuse, somewhat pubescent throughout, a span high or more: stipules lanceolate, short; leaflets obcordate or obovate, rarely oblong, toothed or serru-

---

T. variegatum, Nutt. *T. oliganthum*, Steud. Washington Territory to S. California and Utah.

32. T. MONANTHUM, Gray. Often villous, small, very slender: involucre very small: flowers 1 to 4, much exceeding the short calyx: teeth thin, shortly acuminate. — Proc. Am. Acad. 6. 523. Sierra Nevada.

+ + Involucre membranaceous, at least at base, less deeply lobed; lobes entire or serrate.

33. T. MICROCEPHALUM, Pursh. Villous: heads small: lobes of involucre acuminate, 3-nerved, entire: calyx-teeth long-subulate, with broad scarious margin. — Washington Territory to S. California, and N. Nevada.

34. T. MICRODON, H. & A. Villous: involucre broader; lobes 3-toothed: calyx smooth, angled; teeth rigid, triangular, acute, with a narrow serrulate scarious margin. — Washington Territory to San Francisco; Chili.

35. T. CYATHIFERUM, Lindl. Smooth: heads larger: involucre very broad; lobes short, toothed, many-nerved: calyx-teeth setosely many-branched. — From the Columbia River to N. California and N. Nevada.

* * * Slender annuals: standard becoming conspicuously inflated. — California.

+ Heads mostly large: involucre conspicuous.

36. T. BARBIGERUM, Torr. Somewhat villous: involucre shortly lobed, setaceously many-toothed: calyx-teeth filiform, plumose, sometimes 2–3-parted. — Pacif. R. Rep. 4. 79. Monterey to Mendocino County.

37. T. FUCATUM, Lindl. Smooth, stout: stipules large and scarious: heads large: involucre deeply lobed or parted; lobes entire, acuminate: teeth narrowly subulate, entire or 2–3-cleft. — *T. Gambellii*, Nutt. Pl. Gamb. 151.

+ + Heads small, few-flowered: involucre small or none: calyx-teeth narrowly subulate: small.

38. T. DEPAUPERATUM, Desvaux. Involucre a very small toothed or truncate often scarious ring. — *T. stenophyllum*, Nutt. l. c. Also Chilian.

39. T. AMPLECTENS, Torr. & Gray. Involucre 4–5-parted or cleft, the segments oblong, usually obtuse, entire or nearly so, equalling the calyx. — *T. diversifolium*, Nutt. l. c. 152.

late, three to nine lines long: flowers few, in axillary naked very loose heads, nearly white, two to four lines long, on slender pedicels often half as long, at length reflexed: calyx very narrow, the slender teeth much shorter than the corolla. — In the Sierra Nevada, from the Yosemite Valley, at Clark's, to Sierra County, from several collectors. Of the *T. gracilentum* group, which is otherwise confined chiefly to the Coast Ranges.

TRIFOLIUM PALMERI. A glabrous and diffuse annual, the stems ascending, about a foot high or less: stipules elongated, narrowly acuminate; leaflets oblong to narrowly lanceolate, acute or acutish at each end, serrulate, a half to an inch long: peduncles axillary: heads naked, 10–20-flowered; flowers sessile, at length reflexed: calyx three lines long, deeply cleft into narrow acuminate entire lobes: petals purplish, scarcely exceeding the calyx: pod 2-seeded. — Guadalupe Island; Dr. E. Palmer.

DALEA CALIFORNICA. Shrubby, with the leaves and younger branches canescent with a fine appressed pubescence: glands mostly obscure, but upon the peduncles sometimes prominent and prickle-like: leaflets one or two pairs, linear-oblong, not two lines long, decurrent upon the short rhachis: flowers on short pedicels in a loose raceme, purple, four lines long: calyx half as long, finely pubescent, the ovate acute teeth shorter than the tube: ovules two. — Known as yet only from scanty specimens recently collected by Dr. Parry in the San Bernardino Mountains, California. It adds another to a group of more or less woody or shrubby species, which may be separated as a section *Xylodalea*, characterized by having the claws of the petals adnate to the stamineal tube only at the very base, the flowers spreading or reflexed, mostly in loose spikes or racemes, and the ovules in a few of the species four or six. It includes a dozen species, some with calyx very pubescent and teeth mostly slender (*D. scoparia* Gray; *D. frutescens*, Gray; *D. Emoryi*, Gray; *D. arborescens*, Torr.; *D. polyadenia*, Torr.; *D. amœna*, Watson), others with the calyx sparingly pubescent and broadly toothed (*D. Fremontii*, Torr.; *D. Californica*, Watson; *D. Johnsoni*, Watson; *D. Kingii*, Watson; *D. Schottii*, Torr.; and *D. spinosa*, Gray). The species *D. argyræa*, *D. Parryi*, and *D. leucostachys* are intermediate between this section and the true Daleas. The genus *Asagræa* of Baillon, founded on *D. spinosa* and characterized by the several ovules and simple leaves, can hardly be maintained, as *D. Schottii* likewise has simple leaves but only two ovules, while in *D. scoparia* at least the ovules are four.

LATHYRUS NEVADENSIS.[*] Slender, usually a span high, finely pubescent or nearly glabrous: stipules semi-sagittate, the lobes narrowly acuminate; leaflets thin, two to four pairs, ovate to ovate-oblong, an inch or two long, obtuse or acute; rhachis rarely developing a short tendril at the extremity: flowers ochroleucous or sometimes purplish (?), large (7 to 12 lines long): calyx-teeth shorter than the

---

[*] The North American species of this genus may be arranged as follows:—

§ 1. Rhachis of the leaves tendril-bearing: peduncles mostly equalling or exceeding the leaves: pod sessile.

* Annual: racemes 1–2-flowered.

1. L. PUSILLUS, Ell. Glabrous; stems winged: leaflets 2, narrow: flowers small, purple: pod linear: seeds minutely tuberculate. — S. Carolina to Texas.

The *L. Engelmanni*, Bischof in Linnæa, 14. 132 (Litt.-Bericht), from near Fort Gibson, Arkansas, may be distinct. It is described as with oblong leaves, ciliate stipules, and seeds "ruguloso-exsculptis."

* * Perennials: racemes several-flowered.

+ Stipules large, ovate or somewhat semi-hastate with broad lobes: stout and glabrous, excepting forms of *L. maritimus.*

2. L. MARITIMUS, Bigel. Stipules broadly ovate, acute: leaflets 6 to 10, thick, ovate-oblong, obtuse or acutish, 1 or 2 inches long, nearly sessile: flowers large (9 lines long), purple: calyx-teeth sparingly ciliate. — Seashore, from New Jersey and Oregon northward, and on the Great Lakes. The high northern and arctic form is low and more slender, and more or less densely pubescent.

3. L. POLYPHYLLUS, Nutt. Stipules smaller, triangular, scarcely longer than broad, acute or acuminate; leaflets 12 to 20, thin, oblong, distinctly petiolulate: otherwise like the last. — N. California and Oregon, near the coast.

4. L. OCHROLEUCUS, Hook. Stipules semi-cordate; leaflets 6 to 8, thin, ovate, obtuse or acutish: flowers smaller, ochroleucous. — Northern United States from New England to Washington Territory, and north to Lake Winnipeg.

5. L. SULPHUREUS, Brewer. Glaucous: stipules semi-cordate or semi-sagittate; leaflets 6 to 20, oblong-ovate to linear-lanceolate, about an inch long, acute: flowers sulphur-yellow, 6 lines long. — In the Sierra Nevada.

+ + Stipules narrower, semi-sagittate, the lobes usually lanceolate, acuminate: flowers purple or purplish.

++ Leaflets 8 to 12: peduncles rather many-flowered.

6. L. VENOSUS, Muhl. Stout, climbing, usually somewhat downy: stipules mostly narrow and short; leaflets oblong-ovate, mostly obtuse, about 2 inches long: flowers 6 to 8 lines long: calyx densely pubescent to nearly glabrous: ovary smooth. — Through the Atlantic States to the Saskatchawan, and thence to Washington Territory.

Var. CALIFORNICUS. Stems very stout, often strongly winged: stipules broader; leaflets acute and narrower: flowers larger. — Sonoma County to Monterey, California, and in the foothills of the Sierra Nevada; near water. Intermediate forms occur.

---

7. L. vestitus, Nutt. Slender, often tall, usually more or less downy: stipules narrow, often small; leaflets ovate-oblong to linear, ½ to 1 inch long, acute: flowers pale, 7 to 10 lines long: ovary appressed-pubescent. — *L. strictus*, Nutt. Coast Ranges of California, from Sonoma County to San Diego; very variable.

++ ++ Leaflets 4 to 8: peduncles 2–6-flowered.

8. L. paluster, Linn. Slender, glabrous or somewhat pubescent: stem often winged: stipules mostly narrow, often small; leaflets narrowly oblong to linear, acute, an inch or two long: flowers smaller, 6 lines long. — *L. Lanszwertii*, Kellogg, Proc. Calif. Acad. 2. 105, fig. 44.

Var. myrtifolius, Gray. Stipules usually broader and larger; leaflets ovate to oblong, an inch long or less. — *L. venosus*, var. δ., Torr. & Gray, Fl. 1. 274. *L. polyphyllus*, Watson, Bot. King's Rep. 78. — Very variable: found throughout the northern part of the continent, ranging southward in the mountains to New Mexico, Arizona, and S. California. What appears to be merely a low form with the tendrils undeveloped is found in the Rocky Mountains and westward.

§ 2. Rhachis not tendril-bearing or rarely so: pod shortly stipitate.

* Peduncles long, 2–6-flowered.

9. L. littoralis, Endl. Densely silky-villous: stipules ovate-oblong, acute, entire; leaflets 2 to 6, with a small terminal one, cuneate-oblong, 4 to 6 lines long: flowers purple, 6 to 8 lines long: pod oblong, villous. — On the coast, from Washington Territory to San Francisco.

10. L. Nevadensis, Watson. See above.

11. L. polymorphus, Nutt. Usually low, finely pubescent or glabrous, glaucous: stipules narrowly acuminate; leaflets 6 to 12, thick and strongly nerved, narrowly oblong, acute, 1 or 2 inches long: flowers very large, purple: pod 3 or 4 lines broad: funiculus remarkably narrow and hilum short. — New Mexico and Colorado to Central Arizona.

12. L. ornatus, Nutt. Leaves narrower and shorter: pod somewhat broader: funiculus broader: otherwise resembling the last. — Mountains of Colorado and Utah.

* * Peduncles very short, 1-flowered.

13. L. Torreyi, Gray. Very slender, low, sparingly villous: stipules narrow; leaflets thin, 8 to 12, with occasionally a similar terminal one, ovate to oblong, acute, ½ inch long: flowers rather small, purplish: pod pubescent. — Washington Territory to N. California, near the coast.

Species excluded.

L. linearis, Nutt. and others, including *L. dissitifolius*, Nutt., is only a western form of *Vicia Americana*, with narrow leaflets, = *V. Americana*, var. *linearis*.

tube: fruit not seen. — *L. venosus*, var. *obovatus*, Torrey in Pacif. R. Rep. 4. 77. In the Sierra Nevada, in Calaveras County, where it has been collected by Bigelow, Brewer (n. 1602, 1612), Dr. G. L. Goodale, and H. Mann. Other specimens from the Blue Mountains, Oregon (Rev. R. D. Nevius), and from Northern Idaho (Geyer, n. 312; *L. polymorphus*, Hook. Jour. Bot. 6. 207), are probably the same, with rather narrower and acuter leaflets.

SOPHORA ARIZONICA. An evergreen shrub, somewhat canescent with short appressed silky hairs: leaflets two or three pairs, narrowly oblong, acutish, about an inch long; stipules small, subulate: racemes very short (half an inch long), and few-flowered; bracts deciduous: pedicels bracteolate, about three lines long: calyx narrowed at base: pods smooth, coriaceous, compressed, reticulated and with nerve-like margins, three or four inches long, more or less contracted between the thick oblong (half inch long) seeds; stipe exceeding the calyx. — *S. speciosa*, Torrey in Pacif. R. Rep. 4. 82. At Cactus Pass and on White Cliff Creek in W. Arizona, by Dr. Bigelow; only fruiting specimens found, January. The pod is thinner and more compressed than is usual in the genus and the seed less globose. The more eastern *S. speciosa*, Benth., has very thick and terete silky pods, with ovate seeds, and larger obtuse or emarginate cuneate-obovate or broadly spatulate leaves.

PARKINSONIA TORREYANA. A small tree, twenty or thirty feet high, with smooth light green bark; younger branches and leaves sparingly pubescent: leaflets two or three pairs in each pinna, oblong, obtuse, narrower toward the somewhat oblique base, two or three lines long, glaucous: flowers on long pedicels in racemes terminating the branches; pedicels jointed near the middle, the joint not evident until in fruit: petals apparently bright yellow, four lines long; claw of the upper petal with a thick prominent gland: ovary glabrous: pod with a double groove along the broad ventral suture, usually two inches long or more, 2–8-seeded, straight or somewhat contracted between the seeds: seeds very thick. — *Cercidium floridum*, Torrey in Pacif. R. Rep. 5. 360, t. 3. Abundant on the Lower Colorado River and in the valleys of Western and Southern Arizona, and known as *Palo Verde* or Green-barked Acacia. It has been always mistaken for *P. florida* (*Cercidium floridum*, Benth.), of the Rio Grande Valley, which has sessile axillary racemes, pods with a narrow acute margin on the ventral side, thinner seeds, and somewhat smaller leaflets.

The characters which have been relied upon to separate *Cercidium*, Tulasne, from *Parkinsonia*, do not hold good in regard to our western species, and it becomes necessary to unite the two genera. The *P. microphylla* of Torrey, from W. Arizona (republished by Bentham under the same name in Martius' Flora Brasil.), is certainly rightly referred, the pod being in every respect that of *Parkinsonia*, though the habit and characters of the flowers are those of *Cercidium*. Both genera are alike in the jointed pedicels of the flowers, in the more or less thickened glandular and pubescent claw of the upper petal, in the strongly gibbous filament of the corresponding upper stamen, in the indoubling of the style in the bud, and in the more or less oblique longitudinal veining of the pod. The valvate or slightly imbricate æstivation of the calyx, the straight or torulose and more or less coriaceous pods, and the differences in foliage, cannot be relied upon to distinguish the genera. In addition to the three species already mentioned and the eastern *P. Texana* (*Cercidium Texanum*, Gray), there is perhaps another undescribed species from near Camp Grant in Arizona, and Botteri's n. 994 from Orizaba, Mexico, appears also to be distinct, but the material in both cases is insufficient for a satisfactory description.

CASSIA (CHAMÆSENNA) ARMATA. Herbaceous, about three feet high, minutely puberulent, light green: leaflets two or three pairs, thick, round-ovate, acutish, a line or two in diameter, the margin slightly revolute, distant upon an elongated (two inches long) rigid flattened spinulose rhachis; stipules and glands wanting: flowers in a short terminal raceme, yellow, on slender pedicels and with rigid aculeate-tipped bracts: petals two or three lines long: ovary slightly pubescent; the numerous ovules obliquely transverse: young pod glabrate, stipitate, linear, acuminate, compressed, the sutures thick and nerve-like. — A remarkable species, found by Dr. J. G. Cooper in the mountains of S. California, between Fort Mohave and Cajon Pass, and also by Lieut. Wheeler in W. Arizona.

NEILLIA TORREYI. A small shrub, differing from *N. opulifolia* in its smaller leaves, which are an inch long or often less, its finer pubescence and the leaves sometimes densely white-tomentose beneath, its fewer and smaller flowers (only half as large) on shorter pedicels, the fewer (15 or 20) stamens, and especially the densely tomentose ovaries, which are fewer (usually 1 or 2) and become less inflated. — *Spiræa monogyna*, Torrey, Ann. N. Y. Lyc. 2. 194. *S. opulifolia*, var. *pauciflora*, Torr. & Gray. In the mountains of Colorado and westward to Nevada. Very distinct from *N. opulifolia*, though by no means always monogynous as originally described, and of interest as being a strictly American species of this chiefly Asiatic genus.

SEDUM VARIEGATUM. Glabrous, slender; stems simple, from underground rootstocks (?), erect, an inch or two high: radical leaves none; cauline lanceolate with a broad base, two lines long or less: flowers few (three to six) in a close cyme: sepals broadly ovate, acute, short and purplish: petals twice as long (about two lines), ovate-lanceolate, yellowish with purple midvein: stamens 10, included. — A diminutive species, sent by D. Cleveland, from San Diego.

ŒNOTHERA (SPHÆROSTIGMA) GUADALUPENSIS. A low erect annual (three inches high), branching, finely pubescent: leaves oblanceolate, sessile or the lowest attenuate to a petiole, obtuse or acutish, obscurely sinuate-toothed, an inch long: flowers few, axillary, yellow, very small: calyx-tube obconical, a line long; the lobes as long, close in the bud: capsule oblong-pyramidal, nearly straight, strongly angled, half an inch long: seeds brown, smooth. — Found by Dr. E. Palmer on Guadalupe Island; a peculiar species in the section as respects its capsule, in which it most resembles *Œ. andina.*

MENTZELIA DISPERSA. A slender annual, usually about a foot high; leaves narrowly lanceolate, sinuate-toothed or sometimes entire, rarely pinnatifid, the uppermost often ovate: flowers small, mostly approximate near the ends of the branches; calyx-lobes a line long, little shorter than the five spatulate or obovate petals: filaments not dilated: capsule narrowly linear-clavate, six to nine lines long: seeds very often in a single row, angular and somewhat rhombohedral, more or less grooved upon the angles, very nearly smooth, half a line long. — *M. albicaulis*, var. *integrifolia*, Watson, Bot. King's Rep. 114. From Washington Territory to Colorado and southward, frequent; Yosemite Valley, Bolander; Guadalupe Island, Palmer. Much resembling *M. albicaulis*, Dougl., with which it has been confounded almost from the first, but which is distinguished by its more pinnatifid leaves and slightly larger flowers, and especially by its rather strongly tuberculate seeds, irregularly angled with obtuse margins. The rarer allied species *M. micrantha* differs in its more leafy habit and small ovate leaves, and in its shorter, broader and few-seeded capsules, the seeds a line long.

CUCURBITA PALMATA. Canescent with a short rough pubescence, which is appressed upon the leaves; stems leafy: leaves thick, cordate, two or three inches broad, usually exceeding the petioles, palmately 5-cleft to the middle with lanceolate acuminate lobes, which are often obtusely toothed near the base: flowers three inches long, on stout pedicels: calyx-tube an inch long, the lanceolate teeth three lines long or more: fruit globose; seeds five lines long, rather smaller than in *C. digitata.* — San Diego County: collected in Cajon Valley by D. Cleveland, and at Larken's Station near the Jacumba Mountains by Dr. E. Palmer.

CUCURBITA CALIFORNICA, Torrey MS. in herb. Imperfect specimens of this species were collected by Dr. E. Pickering on the Wilkes Exploring Expedition, at some locality in the Sacramento Valley. The foliage is much like that of the last, but the flowers are smaller, scarcely more than an inch long, exceeding the slender pedicels; calyx-teeth short and linear.

MEGARRHIZA GUADALUPENSIS.* Nearly glabrous, the inflorescence somewhat pubescent: leaves thin, 3–5-lobed to the middle;

---

* MEGARRHIZA, Torrey. The species of this genus have been imperfectly studied, owing to want of material, and the only one at all well known has been the original *M. Californica*, the *Echinocystis fabacea* of Naudin. As already pointed out by Dr. Gray and Dr. Torrey, the genus is separated from the eastern *Echinocystis* by its thick perennial roots, its large turgid immarginate seeds, and its thickened fleshy cotyledons, which remain subterranean in germination, — characters which hold good in all the species, and may be considered as sufficiently distinctive. The following are the species at present known, the characters subject to modification as fuller material may require. Considerable diversity is shown in the internal structure of the fruit, which may perhaps be found to vary to some extent even in the same species.

1. M. CALIFORNICA, Torrey. Nearly glabrous; stems very long: leaves 5–7-lobed, rarely to the middle; lobes broadly triangular, abruptly acute: fertile flowers without abortive stamens: ovary globose, densely echinate, 2-celled (rarely 3–4-celled), the cells 1–2-ovuled; ovules attached to the outer side, the lower ascending, the upper horizontal: fruit globose or ovoid, two inches long, beset with stout almost pungent spines (a half to an inch long), 1–4-seeded: seed obovoid, ten lines long, surrounded lengthwise by a shallow groove or darker line, the hilum at the end. — Pacif. R. Rep. 6. 74. *Echinocystis fabacea,* Naudin, Ann. Sci. Nat. 4. 12. 154, t. 9, and 16. 188. Near the coast from Punta de los Reyes to San Diego.

2. M. MARAH. Scabrous or nearly smooth; stems very long: leaves nearly as in the last: fertile flowers with abortive stamens: ovary oblong-ovate, more or less covered with soft spines, 2–3-celled: ovules 1 to 4 or more in each cell, ascending or horizontal, attached to the outer side of the cell: fruit ovate-oblong, four inches long, somewhat attenuate at each end, more or less beset with weak spines: seeds horizontally imposed, flattish, suborbicular or irregularly elliptical, an inch in diameter, about half as thick, with an obscure marginal furrow and prominent lateral hilum. — *Marah muricatus,* Kellogg, Proc. Calif. Acad. 1. 38. Near San Francisco Bay, at Bolinas, Saucelito, Alameda, Redwood, Corte Madera, &c.

3. M. OREGONA, Torrey. Much like the last: fertile flowers without abortive stamens: young fruit similar in shape, sparingly muricate with soft spines,

lower lobes quadrangular, the upper acuminate, with a few short teeth: flowers in subsimple racemes, six to eight lines broad; calyx-teeth filiform: ovary ovoid, densely covered with short soft spines, on a slender pedicel an inch long, 2-celled; ovules one or two in each cell: fruit ovoid, about two inches long, acute above, somewhat pubescent, and with scattered short stiff spines, usually 2-seeded: seeds subglobose, an inch in diameter, attached to the inner side of the cell, smooth upon the margin. — From Guadalupe Island, by Dr. E. Palmer; growing on high rocks.

SANICULA NEVADENSIS. Low, the peduncles mostly from the base of the stem: leaves ternate with decurrent oblong-ovate 3–5-lobed divisions, the segments lobed or toothed: involucre pinnatifid and toothed: rays about 5, sometimes branched, about an inch long in fruit; involucels somewhat unilateral, of several oblong acute more or less united bracts: flowers yellow: fruit sessile, covered with stout prickles. — In Plumas County, California; collected by Mrs. M. E. P. Ames, and by Lemmon.

CICUTA BOLANDERI. Leaves bipinnate; leaflets narrowly lanceolate, narrowly and sharply acuminate, two inches long, very acutely serrate, the veinlets passing to the sinuses; lower leaflets petiolulate, often deeply lobed: involucre of several linear leaflets: fruit two lines long, nearly orbicular, strongly ribbed and with broad vittæ, which are sunk in the channelled seed. — At Suisun, California, in salt-marshes; Bolander.

ŒNANTHE CALIFORNICA. Stems succulent: leaves ternate and bipinnate, the pinnæ nearly sessile; leaflets approximate, ovate, about an inch long, acute or acutish, toothed, often lobed at base: involucre

---

3–4-celled: cells imbricated above each other, 1-seeded: seeds obovoid, ascending, attached to the outer side of the cell. — Pacif. R. Rep. 6. 74. Common in Washington Territory and Oregon. The ripe fruit has not been collected.

4. M. MURICATA. Nearly glabrous and often glaucous; stems six to eight feet long: leaves usually smaller, deeply 5-lobed, the divisions broader above and sharply toothed or lobed: fertile flowers without abortive stamens, on slender pedicels: ovary oblong, acute at each end, smooth or sparingly muricate: fruit nearly globose, an inch in diameter, naked or with a few short weak spines near the base, 2-celled (or perhaps sometimes 3- or 4-celled), 2-seeded: seed nearly globose, half an inch in diameter, ascending, attached to the outer side of the cell near the base, the margin smooth. — *Echinocystis muricata*, Kellogg, Proc. Calif. Acad. 1. 57. On the lower slopes of the Sierra Nevada, in Calaveras and Placer Counties.

5. M. GUADALUPENSIS, Watson. See above.

of one or two linear bracts or none: fruit crowded, oblong, obtuse at each end; ribs and commissure very corky: seed somewhat dorsally compressed, usually angled; vittæ at the angles. — Found in marshes at Point Lobos and Merced Lake, and southward to San Diego County. — *Œ. sarmentosa*, Nutt., of Washington Territory, differs especially in its more diffuse leaves, the leaflets acuminate and smaller.

LIGUSTICUM FILICINUM. Rather slender, erect, a foot and a half high: leaves broadly triangular in outline, ternate, the divisions bipinnate, and the segments deeply pinnatifid with linear acute lobes: rays 10 to 15, an inch or two long; involucre none; involucels of one or few small linear bracts; pedicels slender: fruit oblong, three lines long, with dilated crenate disk but obscure stylophore, strongly ribbed on the back, the lateral ribs narrow; vittæ obscure: seed flattened, concave on the face, obscurely ridged on the back. — *L. apiifolium*, Watson, Bot. King's Rep. 125. *L. scopulorum*, Parry in Am. Naturalist, 9. 271. In the Wahsatch and Uintah Mountains (n. 454 Watson; n. 82 Parry, S. Utah collection), and northward to Wyoming (n. 121 Parry, N. W. Wyoming collection). Both *L. apiifolium*, of Oregon and California, and *L. scopulorum*, of Colorado, have much less dissected foliage, and different fruit, which is shorter and more oval, with conical stylophore, less flattened carpels, and a medial longitudinal ridge upon the face of the seed. These two species are very similar, but the latter has the more broadly winged ovate fruit, and the more depressed seed. There are indications of one or two other species, but fruit is needed for their confirmation.

SELINUM PACIFICUM. Leaves ternate and bipinnate, the ovate acutish segments an inch long, laciniately toothed and lobed: umbels on stout peduncles, about 15-rayed, with a conspicuous involucre of two or three lobed and toothed leaflets, an inch long and equalling the rays; involucels of several narrowly linear entire or 3-toothed bracts, equalling the flowers; pedicels slender: fruit smooth, oblong, three or four lines long; wings thin, rather narrow; stylopodium slightly prominent above the disk: vittæ conspicuous, very rarely in pairs, the dorsal ones sunk in the body of the seed. — On the Saucelito hills, near San Francisco; Kellogg & Harford, n. 315. This closely resembles a plant of Unalaschka, one of the two northwestern and arctic species which have been referred to the Siberian *Conioselinum Fischeri*, but which are rightly separated from it by Benth. & Hook. in Gen. Pl. 1. 915. The Alaskan species differs in having narrower and acute leaflets, the fruit shorter and more ovate (only two lines long), with often a single prominent calyx-tooth; stylopodium somewhat more prominent, and (in the still immature fruit) the vittæ obscure and seed not grooved beneath the dorsal ones.

ANGELICA TOMENTOSA. Very stout, hoary-tomentose throughout or the stem glabrous: leaves quinate and bipinnate, the leaflets thick, ovate, acute, very oblique at base, unequally serrate with acutish teeth, the lower sometimes lobed, two to four inches long: umbels naked, often dense; rays one to three inches long: fruit broad-elliptical (three lines long by two or more broad), the lateral wings thin and the dorsal acutish: seed thin, flat on the face, channelled on the back under the solitary vittæ. — In the Coast Ranges from San Francisco to Mendocino County; the only species near the coast.

CYMOPTERUS GLOBOSUS. Nearly acaulescent: leaves clustered upon the very short stem, smooth and glaucous, pinnate or bipinnate with broadly oblong pinnatifid segments, the ultimate divisions oblong, obtuse, entire or toothed: involucre and involucels apparently none, and the rays and pedicels obsolete, the flowers and fruit being in dense globose heads a half to an inch in diameter: flowers white: fruit three to four lines long, the thin flat wings a line broad, narrower at base: vittæ solitary in the intervals, two on the commissure; seed slightly concave on the face. — Northern Nevada, collected in the valleys near Carson City by Stretch and Watson, and in the Goshoot Mountains by Beckwith. Referred to by Dr. Torrey in Whipple's Report under *C. montanus* as an abnormal form, and made a variety of the same species in Bot. King's Rep. 124, the fruit of the two having been confounded and the real fruit not examined.

PEUCEDANUM HALLII.* Glabrous, shortly caulescent, the elongated

---

* The western North American species of this confused and rather difficult genus form a group usually readily recognizable. They are found frequenting hillsides or dry valleys, low-stemmed or acaulescent, with thick fleshy roots, the stems rarely solitary, involucres wanting; stylophore nearly obsolete, and disk not dilated. The following characters may serve to distinguish them.

§ 1. Leaves not finely dissected (rarely bipinnate), the segments large or broad or elongated: flowers yellow: calyx-teeth mostly obsolete: fruit glabrous.

* Acaulescent, glabrous: fruit oblong to ovate.

+- Leaves biternate or ternate-quinate; leaflets orbicular to lanceolate: involucels none.

1. P. LEIOCARPUM, Nutt. Often stout and tall: leaflets thickish, narrowly lanceolate to ovate, acute, 1 or 2 inches long, entire or often few-toothed at the apex: rays usually few, elongated: fruit oblong, narrower below, 4 or 5 lines

peduncles six to fifteen inches high: leaves pinnate, oblong in outline, the ovate segments half an inch long, deeply toothed or pinnatifid or pinnate with narrow divisions: involucels small: flowers yellow: calyx-

---

long, narrowly winged: vittæ distinct, solitary, 4 on the commissure. — Washington Territory and Idaho to the Sacramento.

2. P. Nuttallii, Watson. Very similar: leaflets orbicular or ovate, obtuse: fruit shorter and more ovate, very narrowly winged; vittæ obscure, 3 or 4 in the intervals and 4 to 6 on the commissure. — Bot. King's Rep. 128. *P. latifolium*, Nutt. Oregon and N. Nevada.

+ + Leaves pinnate or bipinnate; leaflets narrowly linear: involucels present.

3. P. graveolens, Watson, l. c. Scape 6 to 18 inches high, a little exceeding the leaves: fruit oblong, 4 or 5 lines long, narrowly margined; calyx-teeth evident; vittæ about 2 in the intervals, 4 on the commissure. — *Musenium tenuifolium*, Hook. in Lond. Jour. Bot. 6. 237, not Nutt. Mountains of Utah and Colorado; subalpine.

* * Caulescent (often acaulescent in n. 4): involucels mostly present: vittæ solitary, except in n. 8.

+ Leaflets linear, entire.

4. P. triternatum, Nutt. Finely puberulent, often tall: leaves biternate or ternate-quinate; segments acute: fruit oblong, narrower below, 3 or 4 lines long, very narrowly winged, distinctly ribbed, rarely pubescent; vittæ distinct, 2 on the commissure. — *P. leptocarpum*, Nutt., the acaulescent form. Washington Territory and Idaho to Northern California.

5. P. simplex, Nutt. Similar: leaves ternate or biternate: fruit orbicular, 3 to 6 lines long, emarginate at each end; wings broader than the body; ribs prominent. — Watson, l. c. 129. *P. triternatum*, var. *platycarpum*, Torr. in Stansb. Rep. 389. Montana to N. Arizona.

6. P. ambiguum, Nutt. Glabrous, often low: petioles much dilated at base; leaves 1–2-pinnate with long linear leaflets, the upper often more dissected: involucels very small or none: fruit narrowly oblong, 4 lines long, narrowly winged; 2 vittæ on the commissure, broad and thin. — *P. lævigatum* and *P. abrotanifolium* of Nutt.; *P. farinosum* and *P. tenuissimum* of Geyer. Washington Territory and Oregon to W. Montana; the root much used by the Indians. There is one other imperfectly known allied acaulescent species in the same region, and probably more.

+ + Leaflets ovate, toothed or sometimes pinnatifid: fruit orbicular or elliptical: glabrous.

7. P. Euryptera, Gray. Low: leaves ternate; leaflets broadly cordate, coarsely toothed, an inch long or less: fruit 5 lines in diameter, emarginate at each end, broadly winged; 2 vittæ on the commissure. — Proc. Am. Acad. 7. 348. *Euryptera lucida*, Nutt.; Torrey, Bot. Mex. Bound. t. 27.

8. P. parvifolium, Torr. & Gray. Low, slender: leaves deltoid in outline, biternate, 2 inches long; leaflets ovate, laciniately lobed and toothed or pinnati-

teeth obsolete: fruit glabrous, broadly elliptical, three lines long, the wing half as broad as the body; vittæ three in the intervals, four or six on the commissure. — *P. nudicaule*, Gray, Proc. Am. Acad. 8. 385. Collected in Northern Oregon by Hall (n. 211).

Peucedanum Parryi. Acaulescent, glabrous: leaves lanceolate in outline, bipinnate, the short segments laciniately pinnatifid: peduncles six inches high: involucels small: flowers yellow; calyx-teeth evident: fruit oblong, glabrous, four lines long, narrowly winged; ribs filiform; vittæ undetermined. — *P. macrocarpum*, Parry, Am. Naturalist, 9. 271. In Southern Utah, by Parry (n. 85).

Peucedanum Nevadense. Glaucous, puberulent, shortly caulescent, the peduncles three to fifteen inches high: leaves compoundly dissected with small oblong segments: rays often unequal, an inch or two long: involucels small, of several linear-lanceolate bractlets, usually

---

fid: calyx-teeth somewhat prominent: fruit about 3 lines long, broadly winged, scarcely emarginate; 4 vittæ on the commissure. — Coast Ranges south of San Francisco.

9. P. Hallii, Watson. See above.

§ 2. Leaves decompound; segments narrowly linear; petioles very broadly dilated: involucels conspicuous, of usually scariously margined bractlets: flowers yellow: calyx-teeth obsolete: fruit broadly elliptical, glabrous: caulescent, puberulent.

10. P. caruifolium, Torr. & Gray. Shortly caulescent: leaf-segments ½ to 2 inches long: bractlets often lanceolate: fruit 3 or 4 lines long; ribs obsolete; vittæ indistinct, 2 or 3 in the intervals, none on the commissure. — *P. marginatum*, Benth. Pl. Hartw. 312. Central California.

11. P. utriculatum, Nutt. More caulescent: leaves more finely divided; segments half an inch long or less: bractlets usually much dilated: fruit distinctly ribbed; vittæ broad, solitary in the intervals, 4 to 6 on the commissure. — Washington Territory and Idaho to S. California.

§ 3. Leaves ample, very finely dissected with short filiform segments: flowers yellow: involucels present: calyx-teeth obsolete: fruit glabrous.

* Fruit orbicular or broadly elliptical: acaulescent.

12. P. fœniculaceum, Nutt. Tomentose, sometimes glabrous: involucels gamophyllous, 5–7-cleft: fruit 2 or 3 lines in diameter, winged; ribs prominent; vittæ 1 to 3 in the intervals, 2 to 4 on the commissure. — From the Saskatchawan to Nebraska and the Indian Territory.

13. P. millefolium, Watson. Glabrous, taller: involucels of distinct linear bractlets: fruit 4 or 5 lines long, 3 or 4 broad, broadly winged: vittæ solitary, 2 on the commissure. — Bot. King's Rep. 129. Northern Utah to Washington Territory.

distinct: flowers white: calyx-teeth obsolete: fruit somewhat pubescent, rounded to ovate, three to five lines long, two to four wide; ribs prominent; vittæ two or three in the intervals (sometimes four in the lateral ones, perhaps sometimes solitary), four to six on the commissure. — *P. nudicaule*, Watson, Bot. King's Rep. 130, and others; not Nutt. Eastward of the Sierra Nevada from N. E. California to Sonora and New Mexico.

ARALIA CALIFORNICA. Herbaceous, unarmed and nearly glabrous, eight to ten feet high, from a deep thickened root: leaves bipinnate, or the upper pinnate with one or two pairs of leaflets; leaflets cordate-ovate, four to eight inches long, shortly acuminate, simply or doubly serrate with short acute teeth; terminal leaflets ovate-lanceolate: umbels in loose terminal and axillary compound or simple racemose panicles, which are more or less glandular-tomentose; rays numerous, four to six lines long; involucres of several linear bractlets: flowers a line and a half to two lines long; disk and stylopodium obsolete; styles united to the middle: fruit (still immature) a line and a half long. — Northern California, in shaded mountain ravines and moist places. Much resembling *A. racemosa*, but with larger flowers and involucres, and fewer umbels, larger and with more numerous rays.

---

* * Fruit oblong: caulescent, glabrous.

14. P. BICOLOR, Watson, l. c. Stem short; peduncle elongated: rays few, very unequal: involucel of a few linear bractlets: fruit on short pedicels, 5 to 6 lines long, narrowing from near the base, narrowly winged; ribs filiform; vittæ obscure. — Wahsatch Mountains.

§ 4. Leaves smaller, much or finely dissected with small segments: flowers yellow: involucels present: low, acaulescent.

15. P. VILLOSUM, Nutt. More or less densely pubescent: leaves of very numerous crowded narrow segments: umbels dense in flower: involucels small: fruit oval, pubescent, 3 or 4 lines long; vittæ several in the intervals. — W. Nevada to Nebraska and S. Utah.

16. P. PARRYI, Watson. See above.

§ 5. Leaves much dissected with small segments: flowers white; involucels present: usually low, somewhat caulescent or scarcely so, more or less pubescent.

* Fruit glabrous, oblong or broadly elliptical; vittæ usually solitary.

17. P. MACROCARPUM, Nutt. More or less pubescent: involucels conspicuous, somewhat foliaceous: fruit 4 to 10 lines long, 2 or 3 wide; calyx-teeth evident; ribs filiform; vittæ rarely 2 or 3 in the intervals, 2 to 4 on the commissure. — Var. EURYCARPUM, Gray. Fruit broader: leaves rather more coarsely divided. — Washington Territory to N. California and east to the Saskatchawan; the variety from Oregon to the Sacramento.

18. P. NUDICAULE, Nutt. Nearly glabrous: involucels small: fruit elliptical, 2 or 3 lines long; calyx-teeth obsolete; ribs prominent; vittæ always solitary, 2 to 4 on the commissure. — Nebraska and N. Colorado to Idaho.

* * Fruit tomentose or puberulent, oval-orbicular; vittæ usually several in the intervals.

Cornus Torreyi. A shrub: leaves obovate or oblanceolate, abruptly acute or shortly acuminate, on rather long slender petioles, lighter colored and somewhat pubescent beneath with loose silky hairs: cyme loose and spreading: fruit white; stone obovoid, somewhat compressed, acute at base, ridged on the edges, tubercled at the summit, two and a half to three and a half lines long. — Collected by Dr. Torrey in Central California, but locality not noted. It is very peculiar in the characters of the fruit.

---

19. P. **dasycarpum**, Torr. & Gray. Villous-tomentose: leaves finely dissected: involucels of several linear to oval bractlets: fruit often acutish, tomentose, 4 to 7 lines long; ribs prominent; vittæ usually 3 (rarely solitary) in the intervals, 4 on the commissure. — *P. tomentosum*, Benth. Pl. Hartw. 312. California.

20. P. **Nevadense**, Watson. See above.

Excluded Species.

P. **Newberryi**, Watson, Am. Naturalist, 7. 301. Fine fruiting specimens of this were collected in Southern Utah by Dr. C. C. Parry. The wing of the fruit is found to have a thick corky margin, which requires the reference of the species to *Ferula* (*Leptotænia*, Nutt.), a genus separated by only this character from *Peucedanum*. The habit of the plant is very unlike that of our other species of *Ferula*.

Tiedemannia teretifolia, DC., referred to *Peucedanum* by Benth. & Hook. As compared with our own species of *Peucedanum*, and without reference to foreign forms which may be included in it, this genus appears sufficiently well marked, differing in the distinct marginal nerve of the wings, in the prominent conical stylopodium, in the presence of an involucre, and in the very remarkable habit.

Archemora, DC., another small genus of the Atlantic States reduced to *Peucedanum* by the same authorities, though less distinctly marked than the last, may still conveniently be retained. It differs from the western species in its tall-stemmed erect aquatic habit, thick and short conical stylopodia with short spreading styles, the commissural vittæ in part often shorter than the seed, and the habit of foliage and inflorescence somewhat peculiar. *A. Fendleri*, Gray, of New Mexico and Colorado, is less clearly marked than the two more eastern species.

ATRIPLEX PALMERI. Stout, shrubby at base, diffusely branched, a foot or two high, white appressed-scurfy: leaves obovate or oblanceolate, rounded or acutish at the apex, attenuate to a short petiole, alternate, entire, a half to one and a half inches long: flowers diœcious, in close naked panicled spikes: calyx 5-cleft: bracts compressed, cuneate-orbicular, free, the margin above the middle herbaceous and irregularly laciniately toothed, in fruit somewhat indurated and convex, a line and a half broad, the sides rarely sparingly muricate. — Collected by Dr. E. Palmer on Guadalupe Island. Very nearly allied to *A. Nuttallii*, Watson, of Colorado and northward.

BRAHEA EDULIS, H. Wendland, in letter. Stem sometimes thirty feet high and fifteen inches in diameter: leaves flabelliform, tomentose on the folded edges when young, three feet long, deeply parted into numerous (70 to 80) bifid segments which are lacerately fibrous at the apex; petiole very stout (an inch broad at the top), unarmed, somewhat fibrous-pubescent on the upper side, and terminated by a densely silky-tomentose ligule two inches long: tubular spathes and much-branched spadix densely tomentose: flowers sessile, in clusters of three or more, a line and a half long: calyx 3-parted, shorter than the thick valvate 3-cleft corolla: filaments broad, adnate below to the corolla-tube: ovaries oblong, nearly free; the short styles united: berry solitary, globose, an inch in diameter when dry, the flesh somewhat fibrous: seed globular, 7 or 8 lines in diameter, smooth: albumen horny, not ruminate, with a broad and deep ventral cavity filled by the intruded testa; embryo near the base. — On Guadalupe Island, collected by Dr. E. Palmer; fruiting clusters four feet long and weighing 40 or 50 pounds. The characters above given differ from those of *Brahea*, as described and figured by Martius, especially in the perigynous instead of hypogynous stamens, in the less coherent ovaries and stigmas, and in the form of the albumen, which in *Brahea* has a narrow longitudinal cavity, filled by the testa, extending from the apex nearly to the base; the embryo is also dorsal. In most of these respects it accords more nearly with *Livistona*, but with some discrepancies in other directions.

BRAHEA (?) ARMATA. A second species very similar in its fruit to the last, and evidently of the same genus, was recently collected by Dr. E. Palmer in the Big Cañon of the Tantillas Mountains, about eighty miles southeastward from San Diego. It is described as a tree forty feet high: the leaves are glaucous, nearly glabrous even when young, two and a half feet long, similarly cleft into fewer (30 to 40) entire segments; the large ligule glabrous; petiole a foot and a half long, somewhat brown-hairy on the upper side, margined with a continuous white thickened border which is irregularly toothed; teeth approximate, broad and thick, three or four lines long, pointing upward or often cleft and pointing both ways: fruit rather smaller.

With this was found growing a third species, which from the foliage appears to be the same as the palm found in San Diego county, and recently introduced into cultivation under the name of "*Brahea filamentosa*." Its fruit, however, is very different from that of the preceding, much smaller, black and pulpy with a somewhat crustaceous integument, the seed very small (three lines long), and the albumen scarcely at all excavated. It is also peculiar in other respects. The tree is spoken of as taller and much more handsome than the last.

CYPRIPEDIUM OCCIDENTALE. More or less roughly and glandular-pubescent, a foot and a half high, leafy, usually 2-flowered: leaves ovate, the uppermost broadly lanceolate, acuminate: the brownish narrowly lanceolate sepals and linear-lanceolate petals acuminate, nearly two inches long; lip oblong, an inch long, dull white, veined with purple: sterile stamen oblong-lanceolate, acute, yellow dotted with purple. — *C. parviflorum*, Hook. Fl. Bor.-Am. 2. 205, in part, and Kew Jour. Bot. 7. 376. *C. passerinum*, Gray, Proc. Am. Acad. 8. 403. In the mountains of California from Santa Cruz and Mariposa counties northward to the Columbia River. Frequently collected (Tolmie, Burke, Spalding, n. 334 Geyer, n. 513 Torrey, n. 513 Hall, Bolander, n. 970 Kellogg & Harford, Gray, Nevius), and very similar in habit to *C. parviflorum.*

CARDAMINE GAMBELLII. Perennial, glabrous throughout, erect, a foot and a half high: leaflets four to six pairs, ovate-oblong to linear, sessile, entire or sparingly toothed, acute, three to twelve lines long: flowers white on slender pedicels: petals four lines long, twice longer than the calyx: pods narrowly linear, ascending, an inch long, equalling the strongly reflexed pedicel; beak a line long, slender. — Collected by Gambell near Santa Barbara, and recently by Dr. J. T. Rothrock, of Lieut. G. M. Wheeler's Exploring Expedition, in the same locality. Resembling *C. pratensis.* A very similar form, but somewhat pubescent, has been found by Bourgeau near the city of Mexico.

VAUQUELINIA TORREYI. Shrub or small tree: leaves coriaceous, narrowly lanceolate, acuminate, acute at base and shortly petioled, acutely serrate, white-tomentose beneath, smooth above, pinnately nerved with reticulated veinlets, about an inch and a half long: flowers in small terminal tomentose panicles: petals white, oblong: stamens 25, on the margin of the hairy disk; filaments slender: fruit tomentose, two lines long; cells 2-seeded: seeds oblong, terminated above by a wing as long as the seed. — *Spiræa Californica*, Torr. in Emory's Rep. 140. *V. corymbosa*, Torr. in Bot. Mex. Bound. 64. On the Sierra Verde, near the southern boundary of Arizona, by Schott on the Mexican Boundary Survey, and probably the same as that collected previously by Emory on high mountains near the Gila. The original species, *V. corymbosa*, Correa in Humb. & Bonpl. Pl. Œquin. 1. 140, t. 40, from Central Mexico, differs according to the description and figure in its larger and more deeply serrate nearly glabrous leaves, which are on petioles as long as the blade and with numerous fine parallel nerves, in its calyx naked within, and its 15 to 20 stamens. The embryo in the present species is without albumen, the cotyledons flat, radicle straight and inferior.

POTENTILLA WHEELERI. Small and subalpine, decumbent, silky-villous: stems short, branched and flowering from near the base, leafy: leaves digitate, 3–5-foliolate; leaflets cuneate, 3–5-toothed at the rounded summit, half an inch long or less; stipules entire or nearly so: lower flowers axillary: calyx with obtusish bractlets a little smaller than the lobes: petals obcordate, nearly two lines long, slightly exceeding the calyx: stamens 20: carpels 20: styles filiform. — Collected by Dr. J. T. Rothrock, in the southern Sierra Nevada, about the head-waters of Kern River, at 8,200 feet altitude.

HORKELIA PURPURASCENS. Pubescent and somewhat villous, six inches high: leaflets numerous, approximate, 2–4-parted; segments oblong to obovate, two or three lines long or less; flowers few, rather large, in an open cyme: calyx purplish, about four lines long; bractlets small and narrow: petals rose-colored, broadly cuneate-oblong, nearly equalling the calyx-lobes: stamens 20, in two rows; the filaments opposite to the calyx-lobes and bractlets subulate, the alternate ones filiform: carpels 25, on a nearly naked receptacle. — Collected by Dr. J. T. Rothrock, on the head-waters of Kern River, at 9,000 feet altitude. An unmistakable *Horkelia*, but like *H. tridentata* intermediate between the typical species and those of *Ivesia*, leaving it almost impossible to preserve the latter genus distinct. Specimens of *H. tridentata* have been recently found with decidedly deltoid filaments, showing that this character may fail even to be specific.